"Evaluation of maternal and fetal outcomes with oligohydramnios in third trimester at tertiary care centre a hospital based longitudinal study"

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For the award of the degree of MD/MS in

OBSTETRICS AND GYNAECOLOGY

By

Dr. Manpreet Kaur

(2100365M02P30015)

Under the guidance of

Dr.K Pushpalatha

Professor and Head Of Department

Department of Obstetrics and Gynaecology, AIIMS Bhopal

OCTOBER 2023

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Manpreet Kaur

Dr. Manpreet Kaur

Dr. K. PUSHPALATHA
Reg.No.MP-23817 MBBS,MS
Professor and Head
Department of Obstetrics & Gynaecology
AIIMS Bhopal 462020 (M.P.)

Guide - Dr. K Pushpalatha

Professor and HOD

Department of Obstetrics and Gynaecology

AIIMS Bhopal

Place: Bhopal

Date: 14/10/23

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

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CERTIFICATE

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Dr. K. PUSHPALATHA
Reg.No.MP-23817 MBBS,MS
Professor and Head
Department of Obstetrics & Gynaecology
AIIMS, Saket Nagar, Bhopal-462020 (M.P.)

Dr. K. Pushpalatha

Head of the department

Department of Obstetrics and Gynaecology

AIIMS, Bhopal

Place: Bhopal

Date: 14/10/23

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

BHOPAL

CERTIFICATE

This is to certify that the thesis entitled **"Evaluation of maternal and fetal outcomes with oligohydramnios in third trimester at tertiary care centre a hospital based longitudinal study"** is bona fide and genuine research carried out by **Dr. Manpreet Kaur** under our guidance and direct supervision for the award of MD/MS.

Dr. K. PUSHPALATHA
Reg.No.MP-23817 MBBS,MS
Professor and Head
Department of Obstetrics & Gynaecology
AIIMS, Saket Nagar, Bhopal-462020 (M.P.)

Guide

Dr. K Pushpalatha

Professor and HOD

Dept of Obstetrics and Gynaecology.

Co-guide

Dr. AKDora
डॉ. अरुण कुमार दोरा
Reg. No.-MP-30799 MBBS, MD (O&G)
प्राध्यापक, प्रसूति एवं स्त्री रोग विभाग
अखिल भारतीय आयुर्विज्ञान संस्थान
साकेत नगर, भोपाल, म.प्र. 462020

Dr. Arun K Dora

Professor

Dept of Obstetrics and Gynaecology.

Co-guide

डॉ. अभिजीत पी. पाखरे
एम.बी.बी.एस., एम.डी.
ABHIJIT P. PAKHARE
MBBS, MD
सह आचार्य
ASSOCIATE PROFESSOR
सामुदायिक एवं पारिवारिक चिकित्सा विभाग
Deptt. of Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान, भोपाल
All India Institute of Medical Sciences, Bhopal

Dr. Abhijit P Pakhare

Associate Professor,

Dept of Community and Family medicine.

ALL INDIA INSTITUTE OF MEDICAL SCIENCES

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DECLARATION

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Manpreet Kaur

Dr. Manpreet Kaur

Place: Bhopal

Date: 14/10/23

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Dean (Academics)

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Manpreet Kaur

Dr. Manpreet Kaur

Dr. K. PUSHPALATHA
Reg.No.MP-23817 MBBS,MS
Professor and Head
Department of Obstetrics & Gynaecology
AIIMS, Saket Nagar, Bhopal-462020 (M.P.)

Guide

Dr. K Pushpalatha

Professor and HOD

Dept of Obstetrics and Gynaecology.

Co-guide

Dr A K Dora
डा. अरुण कुमार दोरा
Reg. No.-MP-30799 MBBS, MD (O&G)
प्राध्यापक, प्रसूति एवं स्त्री रोग विभाग
अखिल भारतीय आयुर्विज्ञान संस्थान
साकेत नगर, भोपाल, म.प्र. 462020

Dr. Arun K Dora

Professor

Dept of Obstetrics and Gynaecology.

Co-guide

डॉ. अभिजीत पी. पाखरे
एम.बी.बी.एस., एम.डी.
Dr. ABHIJIT P. PAKHARE
MBBS, MD
सह आचार्य
ASSOCIATE PROFESSOR
सामुदायिक एवं पारिवारिक चिकित्सा विभाग
Deptt. of Community & Family Medicine
अखिल भारतीय आयुर्विज्ञान संस्थान, भोपाल
All India Institute of Medical Sciences, Bhopal

Dr. Abhijit P Pakhare

Associate Professor,

Dept of Community and Family medicine.

LETTER OF PERMISSION

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www.aiimsbhopal.edu.in Email: ihecpgr@aiimsbhopal.edu.in

Ref Number: IHEC-PGR/2021/PG/Jul/09 **Date:** 21st February 2022

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Student Investigator:	**Guide:**
DR. MANPREET KAUR OBGY	DR. K PUSHPALATHA OBGY

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Following members attended the meeting:

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2. Prof. Rajnish Joshi, Professor of General Medicine, AIIMS, Bhopal……Member
3. Prof. Amit Agrawal, Professor of Neurosurgery, AIIMS, Bhopal……Member
4. Dr. Girish Bhat, Assoc. Professor of Paediatrics, AIIMS, Bhopal……Member
5. Dr. Ujjawal Khurana, Asst. Professor of Pathology, AIIMS, Bhopal……Member
6. Dr. Ankur Joshi, Asst. Professor of CFM, AIIMS, Bhopal……Member
7. Dr. Shubham Atal, Asst. Professor of Pharmacology, AIIMS, Bhopal……Member
8. Mr. Yogesh Kumar, Executive Director, Samarthan……Member
9. Dr. Shashank Purwar, Addl Professor of Microbiology, AIIMS, Bhopal…..Member Secretary

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Shashank Purwar

Dr. Shashank Purwar
Member Secretary, AIIMS Bhopal IHEC-PGR
Additional Professor of Microbiology
AIIMS, Bhopal
Contact Number: 7773010099

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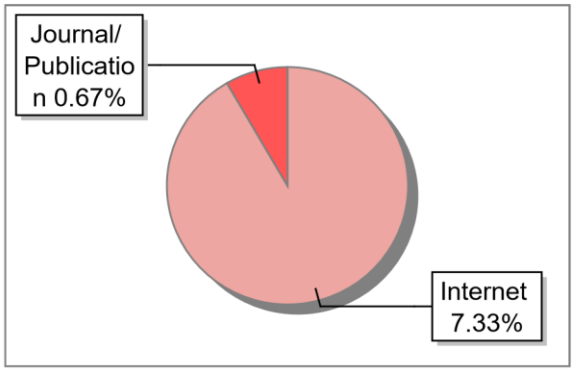

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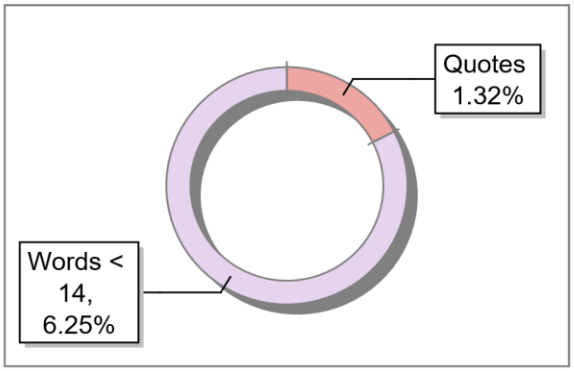

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ABBREVIATIONS

AFI: Amniotic fluid Index

AF: Amniotic fluid

AFV: Amniotic fluid Volume

IUD : Intrauterine Death

SGA: Small for gestational Age

LSCS: Lower Segment Caesarean Section

NICU: Neonatal Intensive Care Unit

RBC: Red Blood Cell

SDVP: Single Deep Vertical Pocket

PROM: Premature rupture of membranes

CTG: Cardiotocography

DNA: Deoxyribonucleic Acid

NSAIDs: Non -steroidal Anti-inflammatory drugs

FHR: Fetal Heart Rate

FGR: Fetal Growth Restriction

TTTS: Twin to twin transfusion Syndrome

OPD: Outpatient department

1.INTRODUCTION

Earth is referred to as the "Blue Planet" because water covers about 70% of its surface. It's interesting to note that water makes up 70% of the average adult human body. The fetus in utero is effectively surrounded by amniotic fluid, which is a natural rule. The amniotic fluid is essential for healthy embryonic growth and development(1).

A crucial flash sign is oligohydramnios. Once it occurs, an obstetrician must consider a wide range of alternatives. Be it IUGR, abnormalities, or membrane rupture, to name a few. A problem for the treating physician is oligohydramnios, since amniotic fluid is the fetus's nourishment and air. Few to no treatment choices are supported by evidence. Oligohydramnios is a common condition that necessitates close fetal monitoring as well as appropriate antenatal and postpartum care. Each doctor seems to take various approaches on a daily basis.

For the purpose of forecasting fetal wellbeing in the womb, the volume of amniotic fluid must be measured. Ultrasonography is the procedure used most frequently to estimate the volume of amniotic fluid. Oligohydramnios refers to a decrease in amniotic fluid volume. In addition to higher perinatal mortality, oligohydramnios is linked to intrauterine growth restriction.

In clinical practice, it can be challenging to interpret an incidental result of low-normal AFI in an otherwise "low-risk" pregnancy because there isn't much data on what will happen next. Establishing the relevance of low-normal amniotic fluid carries clinical importance since the appearance of maternal or fetal problems in the third trimester can be easily addressed by delivery(2).

Rates of caesarean sections are increasing as a result of intrapartum complications and the high rate of perinatal morbidity and mortality, but choosing between vaginal delivery and caesarean sections should be carefully considered so that unnecessary maternal morbidity is avoided and on the other side timely intervention can lower perinatal morbidity and mortality(3).

Due to fetal distress, most frequently caused by underlying cord compression, oligohydramnios is linked to an increased likelihood of caesarean deliveries(4).

Amniotic fluid's complexity is a result of several fetal systems' contributions, numerous functional responsibilities, and numerous interactions with fetal maturation, obstetric, and maternal variables.

Simple ultrasonography measurement has a clinical purpose in fetal surveillance, which is supported by a substantial amount of level II and some level I data. It is probably performed best using the maximum vertical pocket approach. With the exception of intrapartum applications, where effective cesarean delivery reduction for fetal distress and perinatal effects of meconium aspiration may follow amnioinfusion, interventions (amnioinfusion for oligohydramnios, amnioreduction for polyhydramnios) have not been studied effectively in controlled fashion. The modulation of amniotic fluid components and their relationship to preterm delivery offer a variety of research options(5).

Decreased amniotic fluid volume in relation to gestational age is referred to oligohydramnios. The Amniotic Fluid Index (AFI), which is determined by adding the depth in centimeters of the greatest vertical pocket in each of four equal uterine quadrants, is used to define it semi-quantitatively. The amniotic fluid index is used to quantify amniotic fluid, and levels between 5.1 and 7.9 cm are considered low, 3.1 to 5.0 cm are considered moderate, and less than 3.0 cm is considered severe oligohydramnios(6).

The uterus can be separated into four quadrants through the umbilicus at 20 weeks of pregnancy, and the deep vertical pocket in each quadrant can be utilized to determine the AFI. The sum of the four deep vertical pockets makes up the AFI. An AFI of 8 cm is consistent with oligohydramnios.(7).

How oligohydramnios is treated and prognosis depends heavily on the underlying etiology, gestational age at diagnosis, and severity of the illness. The diagnosis of oligohydramnios is more common in the second trimester than the third, and it is more usually linked to fetal or maternal abnormalities in the second trimester than the third. Only 4% of second-trimester pregnancies in one study had an unidentified cause for oligohydramnios, while 52% of third-trimester diagnoses were idiopathic. Only 10.2% of fetuses detected in the second trimester survived, compared to 85.3% of those diagnosed in the third trimester(8).

The most significant indicator of fetal mortality in cases of oligohydramnios discovered in the second trimester is pulmonary hypoplasia. Up to 90% of second-trimester oligohydramnios will pass away, with pulmonary hypoplasia accounting for 87% of those deaths. The most severe pulmonary hypoplasia is caused by oligohydramnios between 16 and 24 weeks of gestation, when the terminal sacs of the fetal lung are developing. Low AFV in the second and early third trimester increases the likelihood of limb contractures and poor birth outcomes because it compresses fetal components(8).

A well-established plan is necessary for better fetal and mother outcomes once oligohydramnios is diagnosed. The termination of a pregnancy through spontaneous, artificial, or surgical means could be important. If labor needs to be induced, the best way to do it should be secure, comfortable, affordable, and effective. However, there is currently no such perfect method. The majority of labor induction techniques currently in use attempt to mimic the physiological course of cervical effacement and dilatation followed by uterine contraction, however most only fully replicate this sequence. Early labor may go slowly. Women can recognize the beginning of labor from a variety of indications, such as uncomfortable contractions and shows. The most used medications for cervical ripening and labour induction include oxytocin, misoprostol, and dinoprostone(9).

The diagnosis of oligohydramnios changes how the pregnancy is managed and might signal delivery. Induction may raise the chance of a cesarean delivery and the dangers of late preterm/early term deliveries, depending on the gestational age.

Therefore, it's crucial to distinguish between the dangers of oligohydramnios and the advantages of on-time delivery(10).

To enable appropriate fetal movement and growth and to protect the fetus and umbilical cord, there must be an adequate volume of amniotic fluid in the womb. In addition to increasing the likelihood of small for gestational age (SGA), caesarean sections, meconium-stained saline infusions, low APGAR scores, and newborn intensive care unit (NICU) admission, oligohydramnios may also delay these processes.

When a pregnancy approaches term, oligohydramnios typically necessitates inducing labor and its incidence ranges from 1-5% at term(11).

For proper screening, diagnosis, and treatment of these illnesses in the antepartum, partum, and postpartum periods, the care and management of patients with amniotic fluid disorders depends on interprofessional communication among a number of physicians. During regular prenatal care visits, obstetricians or midwives often detect oligohydramnios.

Following diagnosis, it is frequently necessary to speak with neonatologists and experts in maternal-fetal medicine who can help establish the best care strategy to reduce the risk of difficulties for both the mother and the fetus.

The care plans cover antepartum treatment, birth timing, and postpartum care, all of which are tailored to the underlying cause of oligohydramnios(12).

2. REVIEW OF LITERATURE

The amniotic sac contains the amniotic fluid, is a transparent, slightly yellowish liquid that surrounds the fetus during pregnancy. This environment supports the fetus' normal growth and development throughout the pregnancy. Throughout the pregnancy, amniotic fluid promotes healthy development of the fetus's respiratory, gastrointestinal, and urinary tracts as well as its musculoskeletal system and permits ongoing fetal growth in a nonrestricted, sterile, and temperature-controlled environment. Through its dampening and bacteriostatic qualities, it shields the fetus from injury and infection. It shields the fetus from vascular and nutritional impairment and prevents compression of the placenta and umbilical cord(13)(2).

Oligohydramnios can have a substantial effect on the result for both the mother and the fetus. It may result in complications for the fetus such as cord compression, lung hypoplasia, growth restriction, low APGAR score, admission to the neonatal intensive care unit (NICU), and fetal mortality. Obstetric problems can include labor that is protracted because of inertia and a higher frequency of surgical interventions(13)(2)(14).

2.1 FORMATION OF AMNIOTIC FLUID

The total volume of fluid entering and leaving the amniotic space is the amniotic fluid volume. It appears to be conserved and kept in a dynamic equilibrium as a result of the complex relationship of maternal, placental, and fetal components. The fact that AF is isotonic with maternal and fetal plasma in the early stages of pregnancy suggests that the fluid is a transudate, possibly from the skin of the fetus or from the mother via the uterine decidua or placenta surface. The non-keratinized fetal skin serves as a membrane and doesn't obstruct the flow of fluids. Early in gestation, the AF can therefore only be regarded as an extension of fetal extracellular fluid(15)(16)(17)(18).and

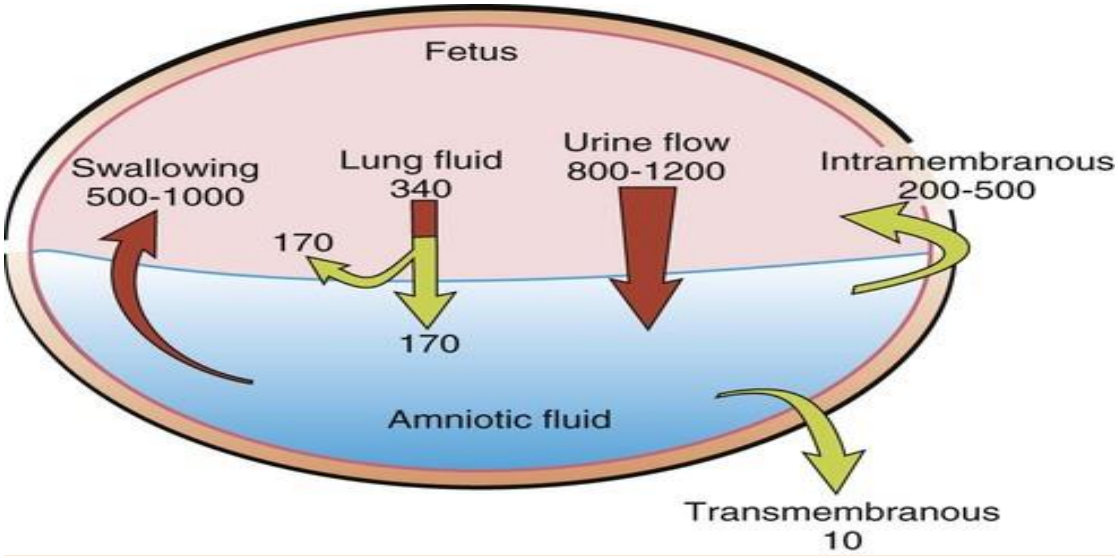
The AF osmolality and sodium concentration decrease as a result of the production of dilute fetal urine around 22–25 weeks of pregnancy, when the fetal skin keratinizes. There are four major volume flows into and out of the sac during late gestation(16). Fetal swallowing and intramembranous absorption, which is the reabsorption of fluid and solutes from the amniotic compartment to the fetal blood via the amnion, are the two primary outflows. The two major inflows are fetal urine and lung liquid secretion. Although other methods of producing and absorbing AF have been looked into, they were found to make little difference to the AFV. In

comparison to intramembranous absorption, the transmembranous route, which refers to the transfer of water and solutes through the surface of the amnion and chorion into the maternal blood inside the uterine wall, is incredibly small(19).and

Additionally, it doesn't appear like fetal oral-nasal secretions into the AF are essential in terms of volume.

2.2 ELIMINATION OF AMNIOTIC FLUID

Figure-1 Following diagram depicts elimination.



- Primarily by fetal swallowing as early as 16weeks. On an average, a fetus swallows 200-450ml/day at term thus eliminating50% amniotic fluid which in turn again may get recycled through the kidneys or absorbed via gastrointestinal tract.
- Secondly elimination may be by fetal respiratory tract. Fetal respiration begins as early as 11 weeks of gestation. It is postulated that owing to relative hypotonicity of amniotic fluid in comparison to fetal plasma, net movement of amniotic fluid occurs into fetal alveolar capillary bed.
- Thirdly hydrostatic and oncotic forces may lead on to elimination of amniotic fluid by continuous bulk flow. Net reabsorption of water may take place at the chorionic plate when amniotic fluid which is hypotonic is exposed to fetal surface of the placenta. At term, amniotic fluid is removed at a rate of 400-500 ml/hour by diffusion and bulk flow.

2.3 FEATURES OF AMNIOTIC FLUID

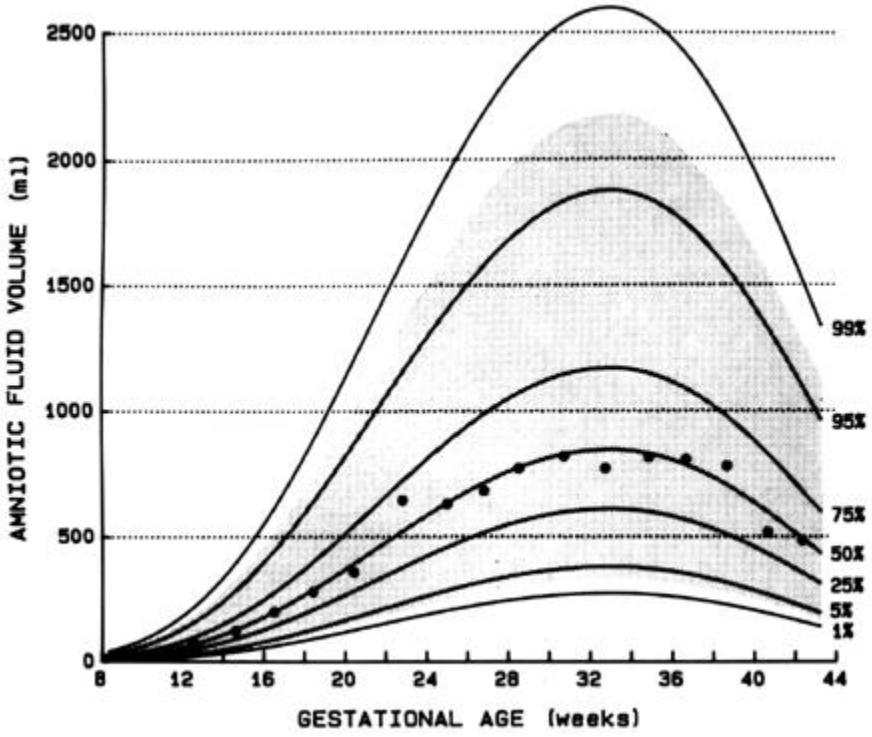
Amniotic fluid has a low specific gravity of 1.010 and is alkaline. As gestation progresses, the osmolality falls. An osmolarity of amniotic fluid of about 250 mosm/l indicates fetal maturity. Early on in pregnancy, it typically has no color. However, exfoliated lanugo and fetal epidermal cells give it a pale straw tint in the short term. The vernix caseosa's presence gives amniotic fluid a muddy appearance.

i) Golden colored amniotic fluid indicates Rh incompatibility due to fetal RBC hemolysis.
ii) Green color indicates meconium staining of amniotic fluid which is suggestive of fetal distress.
iii) Tobacco juice color (dark brown) is found in IUD. and
iv) Greenish yellow (saffron) in post maturity.
v) Dark colored may suggest concealed accidental hemorrhage.

2.4 VOLUME OF AMNIOTIC FLUID

At 12 weeks, the amniotic fluid measures about 50 ml, at 20 weeks, 400 ml, and at 36–38 weeks, it reaches its maximal volume of roughly 1 l. Although there is a significant influx of fluid at term (500–700 ml by urine and 200–400 ml through deglutition), the net increase in amniotic fluid occurs in the third trimester and is only 5–10 ml/day. When the product is finished, the volume is between 600 and 800 ml. At 43 weeks, the amniotic fluid volume has further decreased to a level of roughly 200 ml.

FIGURE 2. FIGURE SHOWING RELATIONSHIP BETWEEN GESTATIONAL AGE AND AFI



Approximately 20 ml of average AF volume is present at 10 weeks of gestation, 630 ml at 22 weeks, and 770 ml at 28 weeks(20). There isn't much of a volume shift between 29 and 37 weeks. In 41 weeks, the average amount of AF drops significantly from 515 ml in 39 weeks. The weekly AF volume then decreases by 33%, which is consistent with the rise in oligohydramnios in post-term pregnancies(21)(22)(23).

TABLE 1 TABLE SHOWING RELATIONSHIP BETWEEN WEEK OF GESTATION, WEIGHT OF FETUS AND PLACENTA AND AFI

Weeks of gestation	Fetus(gm)	Amniotic fluid(ml)	Placenta(gm)
16	100	200	100
28	1000	1000	200
36	2500	900	400
40	3300	800	500

2.5 FUNCTIONS OF AMNIOTIC FLUID

During pregnancy

- Amniotic fluid act as shock absorber protecting the fetus from extraneous injury.
- It facilitates growth and free movement of fetus.
- Thermo regulatory effect.

During labour

- Prevents cord compression.
- Has aseptic and bactericidal action thereby preventing fetal infection.
- Aids in cervical dilatation
- Prevents interference with placental circulation.

2.6 CLINICAL IMPORTANCE

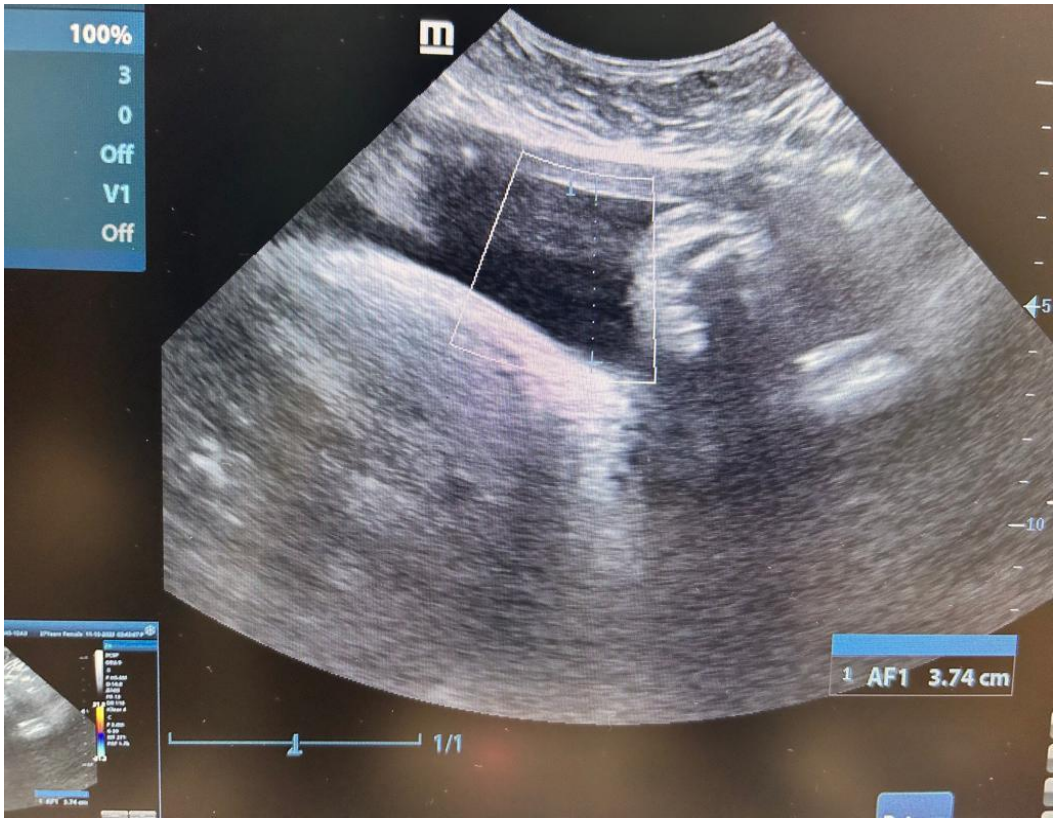
- Amniotic fluid study provides information about fetal maturity and fetal well being.
- Amniotic fluid volume assessment aids in diagnosing polyhydramnios / oligohydramnios.
- Rupture of membranes with drainage of amniotic fluid is a helpful method for labour induction.
- Intra amniotic instillation of chemical is a method for induction of abortion.
- Amniotic fluid testing
    - Chromosome and DNA Analysis
    - Biochemistry
    - Fetal infections
    - Rh disease and other alloimmunisation
    - Lung maturity
    - Chorioamnionitis
    - Obstetric cholestasis
    - Fetal therapy – Decompression
        - Severe oligohydramnios
        - Multifetal pregnancy reduction
        - Thyroxine therapy

2.7 AMNIOTIC FLUID VOLUME MEASUREMENT

Evaluation of amniotic fluid content is now considered standard practice in fetal well-being monitoring, particularly in high-risk pregnancies(24)(25). The Biophysical Profile and the Modified Biophysical Profile are two ultrasound-based scoring systems that include its assessment(5).

Direct, indirect, or sonographic measurements of the amniotic fluid volume are all possible. When a cesarean section or uterine hysterotomy is performed, a direct measurement is taken. The use of the dye dilution technique during amniocentesis allows for indirect measurement. Invasive techniques are the most accurate ways to assess the amniotic fluid volume, but they are also impractical for clinical usage(17). Ultrasound is a non-invasive technique that is frequently used in clinical settings to assess the amniotic fluid volume(26). The AFV is evaluated using a variety of ultrasonography techniques. For accurate results in a subjective assessment, the operator's experience is crucial. The amniotic fluid index (AFI) and the single deepest vertical pocket (SDVP) measurements are the semi-quantitative methods that are most frequently used(25).

***FIGURE 3 USG IMAGE: SHOWING DEEP VERTICAL POCKET WITH NO FETAL PART*.**



3. OLIGOHYDRAMNIOS

Oligohydramnios has historically been thought to be a marker of a potentially poor postnatal outcome as well as a potential indicator of fetal impairment and placental insufficiency. Therefore, thorough fetal monitoring is frequently required upon oligohydramnios diagnosis. Furthermore, even in otherwise straightforward pregnancies, the diagnosis of oligohydramnios at term is sometimes taken as a sign that labor should be induced(24)(26)(27).

Particularly in the second trimester, oligohydramnios may indicate compression of the fetus and result in a sequence of structural and anatomical deformations (also known as the Potter sequence or oligohydramnios deformation sequence) that are frequently linked to fetal or neonatal mortality(28). Furthermore, fetal pulmonary hypoplasia may occur when there is substantial oligohydramnios at certain points of gestation. Loss of lung fluid may cause lung hypoplasia because the alveolar-amniotic gradient is increased by low intraamniotic pressure, which lowers the fluid in the airways, the primary stimulant for lung development. Furthermore, oligohydramnios is independently linked to severe infant respiratory morbidity and overall mortality in women who had an early preterm premature rupture of the membranes(29)(30).

A decrease in Amniotic fluid volume may also result in umbilical cord compression in the late second or third trimester, which might slow the fetal heart rate and necessitate an operation to deliver the baby. Other difficulties associated with oligohydramnios include reduced fetal motion and poor ultrasound vision, which can make amniocentesis difficult to conduct when necessary(5).

Oligohydramnios may develop as a result of post-term pregnancy, preterm labor, preeclampsia, fetal abnormalities, congenital infections, FGR, fetal growth restriction, and other conditions(31)(25)(32). Patients with oligohydramnios have a much higher prevalence of severe congenital malformations like fetal renal agenesis, renal dysplasia, autosomal recessive polycystic kidney disease, and lower urinary tract blockage(28)(33)(34). Initial evaluation of these patients' conditions must involve an ultrasound examination of the fetal urinary tract in particular(35). A prior record related to these medications' use should be looked into because oligohydramnios can also be caused by maternal exposure to drugs including indomethacin, angiotensin receptor blockers, and angiotensin-converting enzyme inhibitors.

Oligohydramnios may appear as a symptom of twin-to-twin transfusion syndrome (TTTS) in monochorionic twin pregnancies.

The frequent detection of oligohydramnios in growth-restricted fetuses is associated with persistent fetal hypoxemia brought on by placental insufficiency, which results in a reduced rate of fetal urine production and renal perfusion due to blood being diverted to the fetal heart, adrenals, and brain(24)(28)(33)(1)(36). Additionally, it has been proposed that a decreased fetal urine production rate serves as an early warning sign of a poor neonatal outcome(37).

3.1 EPIDEMIOLOGY

Oligohydramnios complicates 4.4% of all pregnancies at term. The incidence of oligohydramnios is less than 1% in preterm pregnancies(38).

3.2 ETIOLOGY

The underlying cause for Oligohydramnios is very much essential criterion for evaluating the prognosis and it guides in clinical management.

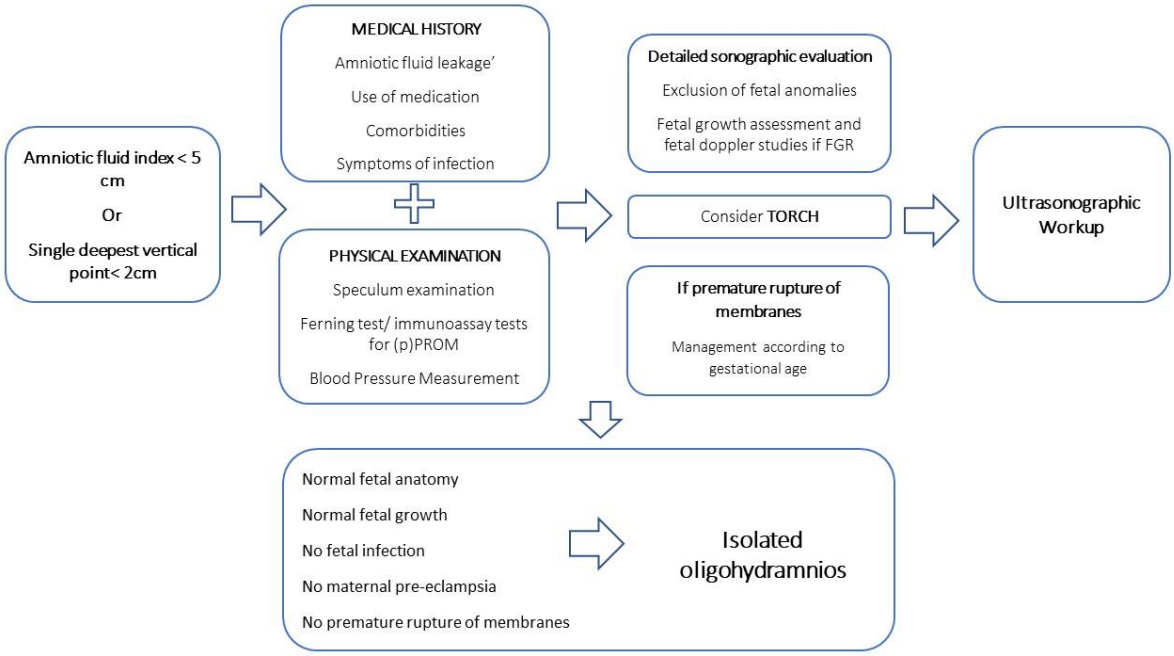
- Bilateral renal agenesis, unilateral renal agenesis with contralateral multicystic dysplastic kidney, bilateral multicystic dysplastic kidneys, and the infantile form of autosomal recessive polycystic kidney disease are some of the renal anomalies. Fetal anomalies, particularly renal anomalies, comprise some of the causes.
- Oligohydramnios can be brought on by conditions that can restrict the bladder outflow, such as urethral stenosis or atresia, posterior urethral valves, megacystis microcolon, and intestinal hyperperistalsis syndrome.
- Oligohydramnios can also result from persistent cloaca and sirenomelia.
- Oligohydramnios has also been linked to medications including ACE inhibitors, Angiotensin receptor blockers, and Nonsteroidal Anti-Inflammatory Drugs. NSAIDs diminish prenatal urine output by constricting the fetal ductus arteriosus. They can also induce acute and chronic renal insufficiency in newborns. ARBs result in ischemic anuric renal failure, renal hypoperfusion, and fetal hypotension.
- Post-term pregnancies frequently result in oligohydramnios. Beyond 40 weeks, Magann and colleagues in 1997 instructed that the volume of amniotic fluid be reduced by 8% per week.
- With fetal growth restriction, maternal complications like preeclampsia, or vascular illness, oligohydramnios is frequently linked to these conditions. Uteroplacental insufficiency can hinder fetal growth and hence reduce fetal urine production.

3.3 Congenital Anomalies associated with oligohydramnios:

- Amniotic band syndrome
- Chromosomal:
  - Trisomy 18
  - Turner syndrome
  - Triploidy
- Cardiac:
  - Fallots tetrology
  - Septal defects
- CNS:
  - Holoprosencephaly
  - Meningocele
  - Encephalocele
  - Microcephaly
- Diaphragmatic Hernia
- Hypothyroidism
- Skeletal
- Genitourinary anomalies
- TRAP Sequence
- Cloacal dysgenesis
- TTTS
- Cystic Hygroma

When oligohydramnios is detected on ultrasound, a complete workup is necessary to identify the underlying reason and select the most appropriate treatment, which depends on the etiology: for instance, amniocentesis in the case of structural fetal malformations or to confirm a suspected congenital infection, hospitalization and antibiotic medication in the event of a preterm premature rupture of the membranes after 24 weeks, and medical treatment of infections, if available.

FIGURE 4. ALGORITHM OF WORK UP IN CASES OF OLIGOHYDRAMNIOS



3.4 ISOLATED OLIGOHYDRAMNIOS

The term "isolated oligohydramnios" describes oligohydramnios when there is no additional sign of fetal structural or chromosomal abnormalities, fetal growth limitation, or infection, and the mother does not have hypertension or renal disease.

It is still unknown why the AFV has diminished in isolated oligohydramnios. Instead of reduced fetal renal blood flow, one of the potential pathophysiological reasons is enhanced AF absorption caused by changes in aquaporin expression(40). In fact, there was no discernible difference between isolated oligohydramnios and normal AFV in the hourly fetal urine production. On the other hand, fetal urine production has been found to decline in growth-restricted fetuses and neonates with poor perinatal outcomes(41). Additionally, there was no discernible difference in the cerebroplacental ratio and renal artery Doppler velocimetry between women with isolated oligohydramnios and those with normal AFV(36).

However, some experts believe that isolated oligohydramnios is a sign of persistent fetal hypoxia or impaired placental function. In a recent study that included a placenta histopathology investigation, it was found that compared to controls, pregnancies complicated with isolated term oligohydramnios had a greater rate of placental maternal vascular malperfusion lesions and a worse newborn outcome. Based on their findings, the authors proposed that isolated oligohydramnios be regarded as a subtype of the "placental insufficiency" spectrum, most likely in a milder form than preeclampsia and FGR. For these

reasons, patients with isolated oligohydramnios who are not having babies may be given the option of once- or twice-weekly prenatal fetal observation(42)(43).

There are conflicting data about the relevance of isolated oligohydramnios and its association with severe perinatal outcomes, despite the fact that several studies have demonstrated that oligohydramnios related to maternal or fetal illness is associated with an increased risk of adverse outcome. Therefore, it is still up for debate how to handle term pregnancies with isolated oligohydramnios(10).

Isolated oligohydramnios has been linked to high rates of obstetric interventions, such as cesarean sections and labor induction, in two recent meta-analyses. While Rossi et al. discovered similar neonatal outcomes compared to pregnancies with normal AFV, Shrem et al. also revealed lower Apgar scores and increased rates of admission to neonatal critical care units in pregnancies with isolated oligohydramnios. However, both meta-analyses came to the conclusion that induction of labor in situations of isolated oligohydramnios is not supported by any convincing evidence of the advantages to short- and long-term newborn outcomes(27)(32). Uncertainty exists regarding whether the reported bad outcomes are a direct result of the lowered AFV itself or whether they result from the medical intervention's side effects, fetal and maternal comorbidities, or both.

3.5 DIAGNOSIS OF OLIGOHYDRAMNIOS

- The uterus is substantially smaller than a period of amenorrhea.
- Decreased fetal movements.
- Growth restriction will be present.
- On ultrasonography low AFI

3.6 CLINICAL SIGNIFICANCE OF OLIGOHYDRAMNIOS

In general, less amniotic fluid is linked to a higher incidence of SGA infants (less than the 10th percentile for gestational age), post maturity syndrome, variable and late decelerations in labor, caesarean sections for unreliable fetal heart rate tracing, lower umbilical artery pH, lower Apgar scores, and a higher rate of perinatal mortality. Because of pulmonary hypoplasia and potentially fatal congenital abnormalities, second trimester oligohydramnios is particularly linked to poor neonatal outcomes.

After PROM and Oligohydramnios in the extremely preterm gestation (24 weeks), pulmonary hypoplasia can develop as indicated by low wet lung weights, falling DNA content, and low

radial alveolar counts. It may be caused by fetal respiratory movement inhibition, a restriction of lung expansion related to prolonged external compression, and a lack of fluid flow into the terminal alveoli, which may necessitate the growth factors necessary for alveolar development found in amniotic fluid. The chance of Potter's sequence, which involves fetal skeletal and facial malformations due to prolonged external compression in addition to pulmonary hypoplasia, increases with further prolonged oligohydramnios.

The following summarizes the problems caused by oligohydramnios:

3.7 MATERNAL COMPLICATIONS

- Increased operative interference as a result of malpresentations,
- Chorioamnionitis,
- Prolonged Labor owing to Inertia

3.8 FETAL COMPLICATIONS

Due to etiology

- Chromosomal abnormalities
- Congenital anomalies
- Intra uterine death
- Fetal growth restriction
- Intra uterine infection following PROM
- Prematurity

Due to reduced amniotic fluid volume:

- Skeletal deformities
- Contractures
- Amniotic bands and auto amputation
- Pulmonary Hypoplasia
- Umbilical cord compression
- Meconium aspiration
- Low APGAR Scores.

3.9 PROGNOSIS OF OLIGOHYDRAMNIOS

Oligohydramnios in first and second trimester

Between 13 and 24 weeks, 51% of fetuses with severe oligohydramnios have fetal abnormalities (1% are aneuploid), 34% have preterm premature membrane rupture, 7% have abruption, and 5% have growth limitation. If oligohydramnios are found during this time, a thorough search for these should follow. When oligohydramnios and fetal abnormalities are present, the chances of survival are reduced. When significant oligohydramnios is detected in the second trimester, amniocentesis may be suggested. For some cases, there are specific therapies available, such as the bladder amniotic fluid shunt for posterior urethral valves.

Oligohydramnios at term

Oligohydramnios occurs in 1% - 5% of pregnancies at term. Since the incidence of adverse outcomes are more in high risk pregnancies complicated by oligohydramnios, labour induction is done. However isolated oligohydramnios at term is not associated with poor maternal or fetal outcomes.

3.10 MANAGEMENT OF OLIGOHYDRAMNIOS

It is crucial to get checked for fetal growth and malformations. Due to higher rates of morbidity and death, careful fetal surveillance is carried out in cases of pregnancies that also have fetal growth restriction and oligohydramnios.

Expectant management is desirable but upgraded fetal surveillance is necessary in situations of pregnancies complicated by oligohydramnios before 36 weeks of gestation when not accompanied with fetal abnormalities or fetal growth limitation.

It is necessary to perform periodic prenatal testing, such as nonstress tests and biophysical profiles that include assessments for the existence of varying decelerations.

Oligohydramnios can be managed intrapartum well with amnioinfusion. Patients who had PROM and had preventive amnioinfusion showed a considerably decreased rate of varied decelerations and higher cord pH values, according to Nageolte and colleague.

3.11 REVIEW FROM DIFFERENT STUDIES

A retrospective cohort study was conducted by Melamed et al in 2011 which included 108 pregnant women with isolated oligohydramnios. Pregnancy outcomes was compared with control group with low risk pre term pregnancies. It was observed that isolated oligohydramnios patients had higher risk for preterm deliveries, induction of labour and caesarean delivery with a p value of <0.001. neonatal outcomes included low birth weight and neonatal morbidity.

In a study conducted by Haifa et al in 2019, which included 180 pregnant women between 37-42 weeks period of gestation admitted for induction of labour and delivery. The women were divided into two groups: AFI>5CM, AFI<5 CM and perinatal outcomes was evaluated in these two groups. It was found out that in the oligohydramnios group the number of caesarean deliveries due to fetal distress was significantly higher with the oligohydramnios group with a p value of <0.05.

A multicentered randomized control trial consisting of 1024 pregnant female was conducted by Kehl et al in 2016in Germany. Amniotic fluid index and single deep vertical pocket was compared to predict the adverse pregnancy outcomes. It was found out that with amniotic fluid index the prediction of oligohydramnios increased and increased labour inductions without improving perinatal outcomes. Hence single deep vertical pocket was a better predictor of oligohydramnios thus improving perinatal outcomes.

Shrem et al conducted a systematic review and meta-analysis in 2016 to understand the association of isolated oligohydramnios at term with perinatal morbidity and mortality. 35000 pregnant women with 2000 women with oligohydramnios and 33000 had normal liquor volume. Patients with oligohydramnios has higher rates of labour inductions and caesarean sections and higher rates of APGAR with <7 at 1 min and 5 min and higher rates of neonatal intensive care units.

Hederlingova et al conducted a retrospective case control study in 2017at Bratislava. 372 pregnant women with isolated oligohydramnios on ultrasound report after 3 weeks period of gestation were included in the study. It was found that women with oligohydramnios had greater number of obstetric interventions in the form of induction of labour and caesarean deliveries than the control group.

Manzanares et al conducted a retrospective study in 2020 that included 412 pregnant women with low risk term gestation who were admitted for induction of labour. The pregnant women were divided into two groups: 206 women were induced for isolated oligohydramnios and 206 women had normal liquor. It was observed that rate of caesarean deliveries and C-sections for non-reassuring fetal status, operative vaginal delivery rates and those for non-reassuring fetal status were higher in the oligohydramnios group than in the control group.

A randomized control trial was done by Lester et al in 2020 in low and middle income countries that included pregnant women in third trimester who underwent an ultrasound. Women were divided into two groups: those with oligohydramnios and those without oligohydramnios and maternal and fetal outcomes were compared in both groups.Women with oligohydramnios had greater rates of hemorrhage, fetal malposition, and caesarean delivery than women normal liquor,it was also found that fetal and neonatal outcomes in patients with oligohydramnios included stillbirths , neonatal deaths < 28 days, low birth weight and preterm births. The mean birth weight was 162 g less (95% CI -288.6, - 35.9) with oligohydramnios.

A study was conducted by Vyas et al in 2021, that included 200 pregnant women who met the inclusion criteria in Bhuvaneshwar. Pregnant women were divided into two groups: one with borderline oligohydramnios and another group with normal liquor. This was observational prospective study. It was found out that Maternal outcomes such as preterm delivery, meconium-stained liquor, and lower segment caesarean section was significantly associated with borderline AFI ($p \leq 0.001$). The borderline AFI group had a higher rate of perinatal complications such as Apgar score of <7 ($p = 0.001$), respiratory distress syndrome ($p = 0.001$), neonatal intensive care unit admission ($p < 0.001$), intrauterine growth restriction ($p < 0.001$), and low birth weight ($p < 0.001$).

Another study was conducted by Molla et al in 2023 in North West Ethiopia, where 264 pregnant women with oligohydramnios in 3rd trimester who met the inclusion criteria were included in the study. It was found out that presence of oligohydramnios in third trimester was found to have adverse pregnancy outcomes and indicators of adverse

pregnancy outcomes were nulliparity, hypertensive disorders of pregnancy and fetal growth restriction.

A study was conducted by Anna et al between 1997- 2000 that included 3040 pregnant women without any pregnancy complications. The perinatal outcomes in terms of caesarean delivery, low birth weight, meconium stained liquor and apgar>7 at birth was measured. It was found out that amniotic fluid index < 5 cm was significantly associated with low birth weight with a p value of < 0.05.

In a study conducted by Ovoke et al in Southern Nigeria at a tertiary hospital in 2021, a cross sectional study was conducted that included 100 high risk pregnant women and amniotic fluid index and 2 pocket diameter was calculated and its association with adverse perinatal outcome was determined. It was found out that 2 pocket diameter had more sensitivity in predicting adverse perinatal outcomes complicated by oligohydramnios than that predicted by amniotic fluid index.

Rhoadas and et al conducted prospective cohort study estimate the effect of oligohydramnios on fetal heart rate (FHR) patterns in patients undergoing induction of labor (IOL) at term.3,640 of the 3,787 patients who had IOL did not have oligohydramnios, compared to 147 who had the condition. Between the two groups, there was no discernible variation in the EFM features. The composite newborn morbidity did not differ. EFM patterns with baseline tachycardia for at least 30 minutes were significantly linked to composite newborn morbidity in patients with oligohydramnios (31.3 vs. 5.3% adjusted odds ratio 8.63, 95% confidence interval 2.18,34.1). The EFM patterns of term patients receiving IOL with oligohydramnios were the same as those of their induced counterparts.

Sapoval and et al states that ultrasound in obstetrics is an invaluable tool in the evaluation of the pregnant patient. A fast assessment can offer crucial information regarding the management of obstetric issues due to its simplicity of use and interpretation. The biophysical profile (BPP) is a maximum 30-minute-long ultrasound examination that evaluates the health of the fetus while also tracing its heartbeat. A non-stress test, an evaluation of the fluid index, fetal breathing movements, total body movements, and limb tone as shown by flexion and extension of the limbs are the

components. The modified BPP is a condensed study that includes an amniotic fluid index (AFI) and a non-stress test (NST). In comparison to short-term disorders like an abnormal NST or fetal respiratory movements, abnormal amniotic fluid is associated with a lower pH.

According to Chauhan and colleagues (1999), oligohydramnios-complicated pregnancies had higher rates of caesarean sections for fetal distress and increased risk of APGAR<7 at 5 minutes.

Pregnancies complicated by oligohydramnios, according to Petrozella and colleagues (2011), had a higher risk of stillbirth, preterm birth, growth limitation, and fetal discomfort.

4. AIMS AND OBJECTIVE

AIM OF THE STUDY:

Evaluation of maternal and fetal outcomes among pregnant women with oligohydramnios in third trimester at tertiary care centre.

OBJECTIVES

Primary objective:

- To study Evaluation of maternal and fetal outcomes with oligohydramnios in third trimester at tertiary care centre.

Secondary objective:

- Categorize feto-maternal outcomes as favorable or unfavorable and compare difference in distribution of other factors such as severity of oligohydramnios, induction etc. across these outcomes in order to identify high risk antenatal cases
- To compare outcomes among categories of oligohydramnios (mild moderate and severe) in case of fetal outcomes-NICU Admissions, APGAR score at 1min and 5min in case of maternal outcome-need for induction of labor, caesarean and vaginal delivery.
- To compare the Non-Reassuring fetal heart rate during CTG monitoring.

5. MATERIAL AND METHODS

• **Study Area**:

Study was conducted in the Department of Obstetrics and Gynaecology, **ALL INDIA INSTITUTE OF MEDICAL SCIENCES, Bhopal, Madhya Pradesh, India.**

• **Study population**:

Third trimester antenatal patients with mild and severe oligohydramnios who are consenting to participate in the study.

• **Study Design**:

The study is Hospital based Longitudinal study.

• **Study period**:

18 months after getting necessary approval from thesis review committee and Institutional Human Ethics Committee.

• **Method**:

Study was initiated after due regulatory approvals and letter of permission from the IHEC. Written and informed consent was taken from all the participants and participant confidentiality was maintained during data analysis and dissemination. Office evaluation in all women included a thorough history, physical examination, routine investigations, USG with doppler and maternal and fetal outcomes was studied.

Patients were followed up in each antenatal visits and ultrasound was done to measure amniotic fluid index in 3rd trimester.

Inclusion criteria (study group)

1. Gestational age more than >28 weeks of gestation
2. Intact membranes
3. Amniotic fluid index less than or equal to 8cm

Exclusion criteria: study group

1. Gestational age less than <28 weeks
2. Rupture of membranes
3. Previous history of LSCS
4. History of congenital anomalies
5. Chronic medical disorder in mother
6. Mother in active labor

Study procedure

• Informed consent was taken from every patient presenting to All India Institute of Medical Sciences OPD regarding inclusion in study.

• Informed consent with a diagnosis of oligohydramnios was taken from every patient, as is a routine in our centre.

• An assessment chart for each patient was prepared.

• After selection of cases, detailed history, including (obstetric history, menstrual history, past history, family history, personal history) will be taken. Complete examination (general examination, systemic examination, abdominal examination and pelvic examination) was done.

• Clinical evidence of oligohydramnios was looked and for confirmation of oligohydramnios

Patient was sent in departmental USG Room for ultrasound examination and doppler studies The patient was positioned supine for measuring AFI. To obtain the maximal vertical pocket (MVP), the entire uterus was scanned, for this probe was held perpendicular to the floor and coronal to the patient, and the pocket of amniotic fluid with the greatest vertical length was identified. Vertical callipers was used to measure the depth in cm of amniotic fluid, which was appearing hypoechoic on ultrasound. When measured the depth of a pocket, it was taken care that the callipers do not cross any fetal body part or portions of the umbilical cord as this may exaggerate the size of the pocket. For obtaining the amniotic fluid index (AFI), the same process above will be repeated four times, with the uterus divided into four quadrants and the

umbilicus as a central point, each quadrant's largest vertical pocket will be identified and measured. The criteria above apply to the pockets obtained in each quadrant. The measurements were added to obtain the total. After that USG findings was recorded appropriately and one copy was handed over to the patient. Based on ultrasound findings, patients with oligohydramnios (AFI less than or equal to 8) was taken into study outcome measures was recorded like gestational age at delivery, color of amniotic fluid, FHR tracings, mode of delivery, indication for caesarean, section or instrumental delivery, Apgar score at one minute and five minutes, birth weight, admission to Neonatal Intensive Care Unit (NICU), perinatal morbidity and perinatal mortality.

6. DEFINITIONS

LABOR: Labor is the presence of uterine contractions of sufficient intensity, frequencyand duration to bring about demonstrable effacement and dilation of the cervix.

INDUCTION OF LABOR: Labor induction is the use of medications or other methods to bring on (induce) labor.

ACTIVE LABOR: It is the stage of Labor which is characterized by regular contractions and marked 6 cm or more cervical dilation(45).

OLIGOHYDRAMNIOS: Oligohydramnios is classified on the basis of AFI as follows(6):

MILD: : (AFI = 5.1–7.9 cm)(6),

MODERATE : (AFI = 3.1–5.0 cm)(6)

SEVERE : (AFI = <3.0 cm)(6)

PLACENTA PREVIA: Placenta previa is the complete or partial covering of the internal os of the cervix with the placenta.

INSTRUMENTAL DELIVERY: Vaginal delivery is accomplished with the aid of instruments which can be vacuum or forceps(46).

CESAREAN SECTION: Caesarean section is a fetal delivery through an open abdominal incision (laparotomy) and an incision in the uterus (hysterotomy)(47).

APGAR SCORE: "Apgar scoring is designed to assess for signs of hemodynamic compromise such as cyanosis, hypoperfusion, bradycardia, hypotonia, respiratory depression, or apnoea. Elements of the Apgar score include color, heart rate, reflexes, muscle tone, and respiration. Each element is scored 0 (zero), 1, or 2. The score is recorded at 1 minute and 5 minutes in all infants with expanded recording at 5-minute intervals for infants who score seven or less at 5 minutes, and in those requiring resuscitation as a method for monitoring response. Scores of 7 to 10 are considered reassuring"(48).

PERINATAL MORTALITY: Death of Fetus after 24 completed weeks of gestation and death before 7 completed days after delivery.

BISHOP SCORE: The "Bishop scoring system" explains that on a digital cervical exam of a patient with a zero point minimum and 13 point maximum. The scoring system utilizes cervical dilation, position, effacement, consistency of the cervix, and fetal station. Cervical dilation, effacement, and station are scored 0 to 3 points, while cervical position and consistency are scored 0 to 2 points. A Bishop score of 8 or greater is considered to be favourable for induction, or the chance of a vaginal delivery with induction is similar to spontaneous labor." A score of 6 or less is considered to be unfavourable if an induction is indicated cervical ripening agents may be utilized(49).

AMNINOTIC FLUID INDEX: "An amniotic fluid volume estimate and is a part of fetal biophysical profile".

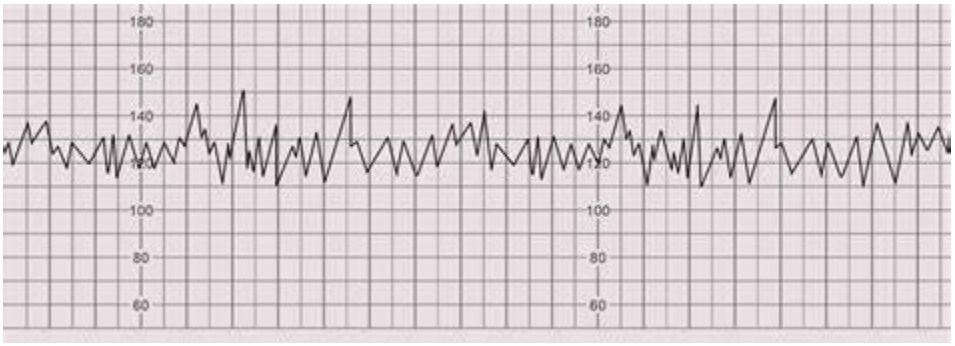
CARDIOTOCOGRAPHY

In most high-income nations, cardiotocography (CTG) is an essential component of intrapartum treatment. The low interobserver agreement seen in tracing interpretation is one of the acknowledged drawbacks of cardiotocography

CTG BASELINE:

NICE GUIDELINES: Mean level of the FHR when this stable, excluding accelerations and decelerations. It is determined over a time period of 5 or 10 min and expressed in bpm

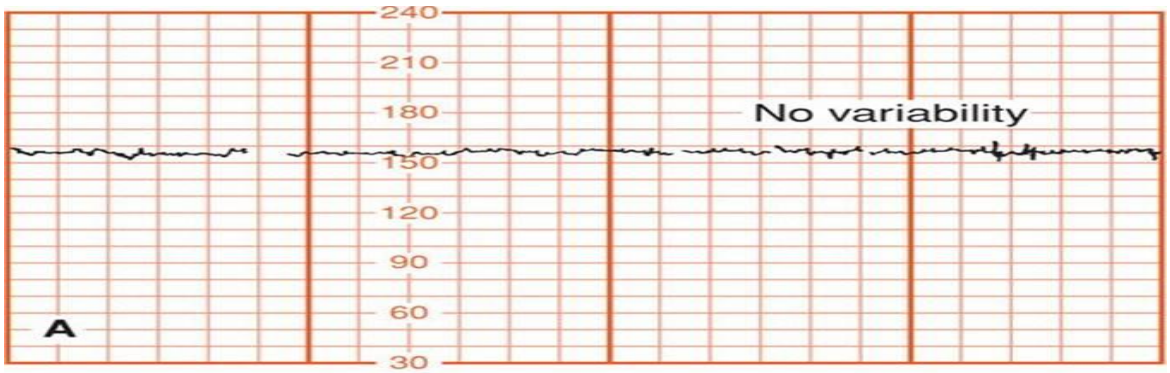
Normal baseline: NICE 110–160 bpm



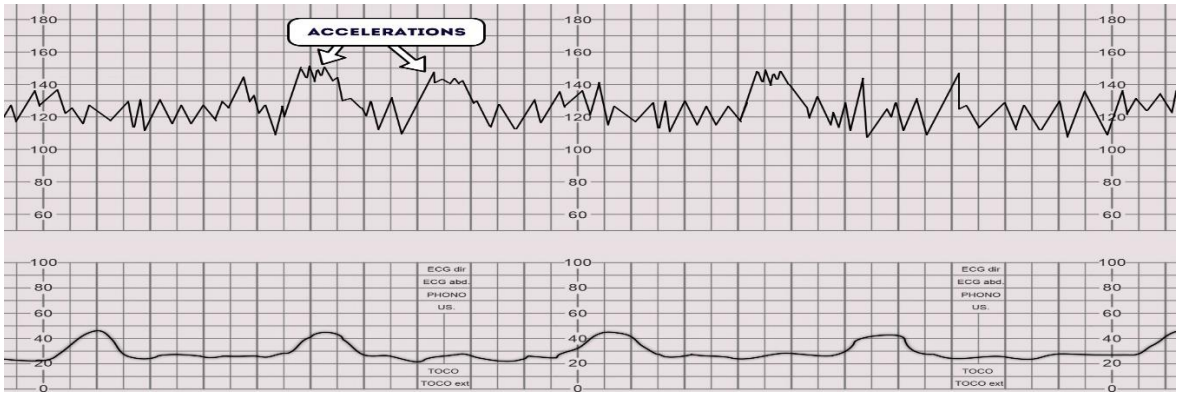
VARIABILITY: NICE The minor fluctuations in baseline FHR occurring at three to five cycles per minute. It is measured by estimating the difference in bpm between the highest peak and lowest trough of fluctuation in a 1-min segment of the trace

Normal variability: NICE ≥5 bpm between contractions

Reduced variability: NICE: >90 min (abnormal variability)

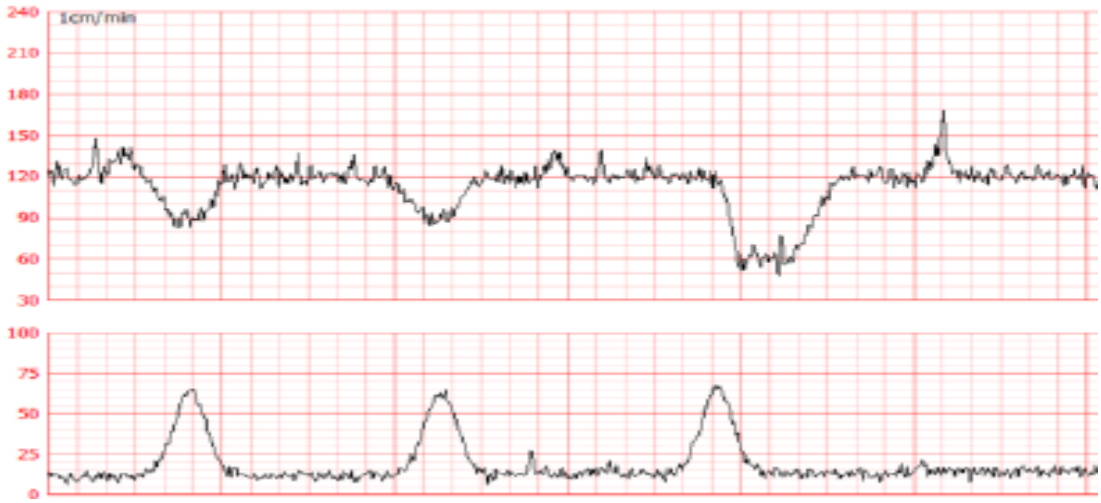


ACCELERATIONS: NICE: Transient increases in FHR of ≥15 bpm and lasting ≥15 s



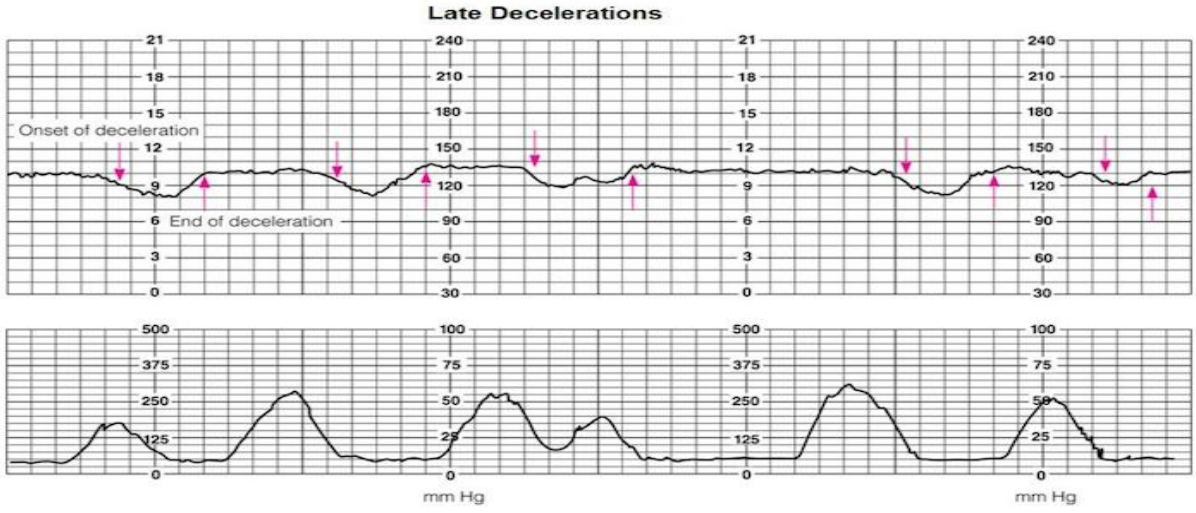
DECELERATIONS: NICE: Transient episodes of slowing of FHR below the baseline level of >15 bpm and lasting ≥15 s or more

EARLY DECELERATIONS: NICE: Uniform, repetitive, periodic slowing of FHR with onset early in the contraction and return to baseline at the end of the contraction

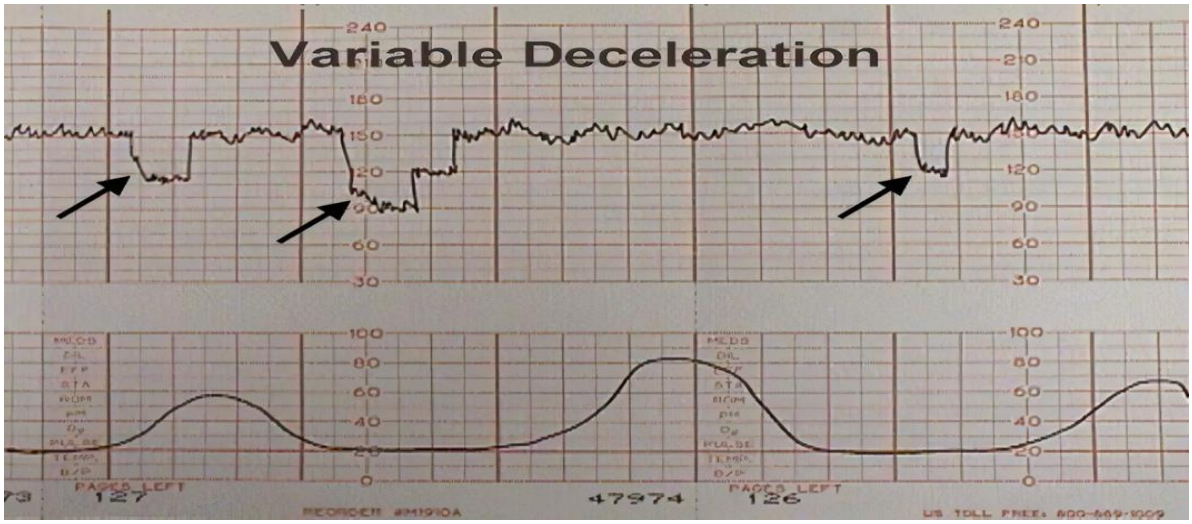


LATE DECELERATIONS:

NICE: Uniform, repetitive, periodic slowing of FHR with onset mid to end of the contraction and nadir >20 s after the peak of the contraction and ending after the contraction. In the presence of a non-accelerative trace with baseline variability 10 years of experience in CTG analysis, three had 6–10 years of experience, and three had 0.80 as almost perfect reliability.



CONTINUED VARIABLE DECELERATIONS: NICE: Variable, intermittent periodic slowing of FHR with rapid onset and recovery. Time relationships with contraction cycle are variable and they may occur in isolation. Sometimes they resemble other types of deceleration patterns in timing and shape.


Variable Deceleration
240
210
180
150
120
90
60
30
100
80
60
40
20
0
PACE 8 LEFT
127
47974
PACE 8 LEFT
126

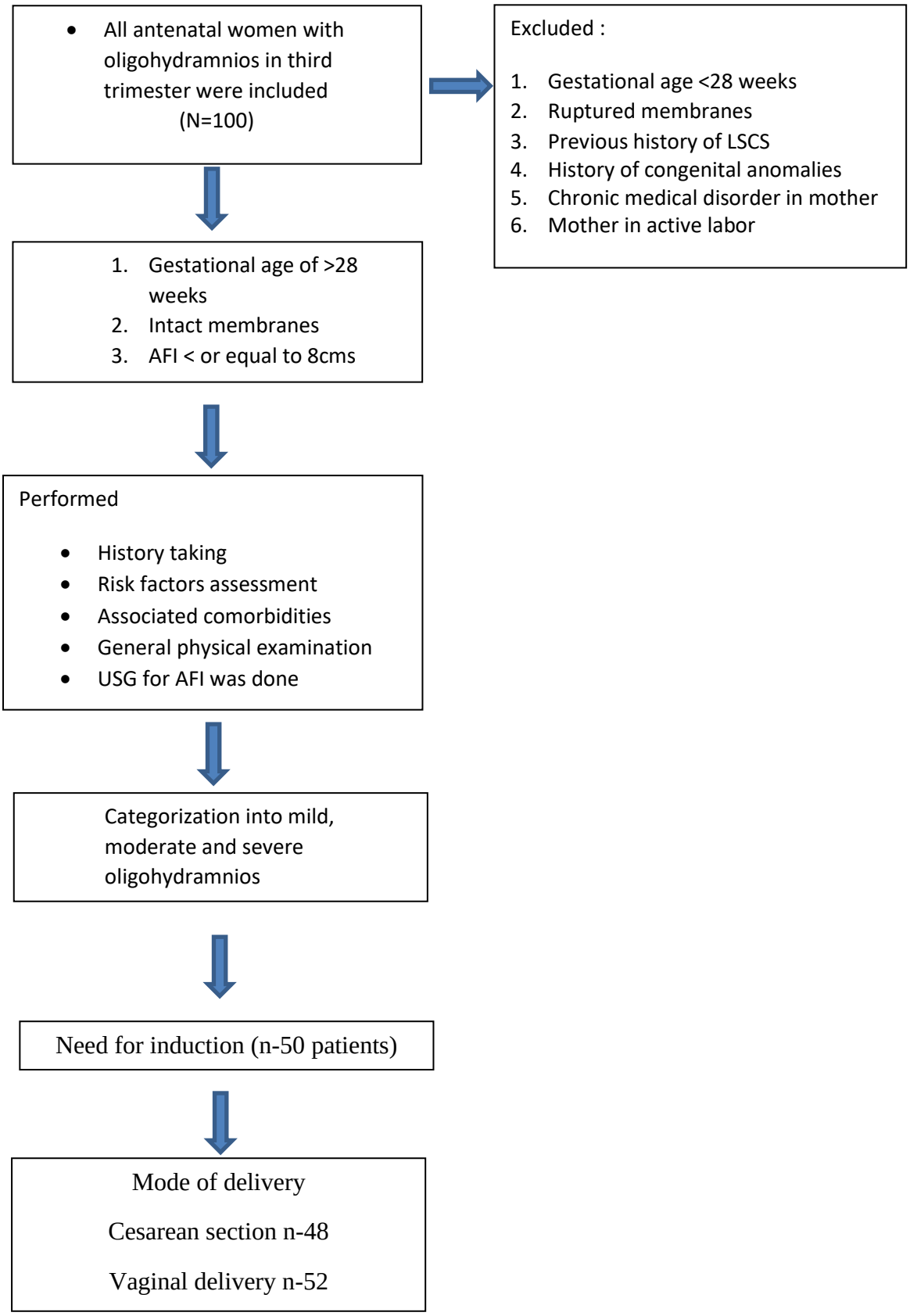
7. SAMPLE SIZE CALCULATION

Our primary objective was to describe frequency or average of various maternal and fetal outcomes which is exploratory in nature. Also, this being a post-graduate dissertation data collection period is limited. Considering this we have decided sample size on logistics and feasibility i.e., all consecutive patients who are eligible as per inclusion criteria within data collection period of 18 months. We expect 100 patients. For any statistical test applied as part of secondary objectives, estimates of power for Type-1 error of 5% will be reported.

Statistical analysis:

Analysis was done by using R software. Nominal or categorical variables were summarized as frequency and percentage. Continuous variables were summarized as mean and standard deviation when normally distributed and as median and interquartile range when non-normally distributed. Appropriate statistical tests for nominal and numerical variables like Chi square and t – test /ANOVA or their non-parametric variants were applied appropriately. To identify independent factors associated with maternal/fetal outcome measures, multivariate regression analysis were used.

8. FLOW CHART


All antenatal women with oligohydramnios in third trimester were included (N=100)
Excluded :
1. Gestational age <28 weeks
2. Ruptured membranes
3. Previous history of LSCS
4. History of congenital anomalies
5. Chronic medical disorder in mother
6. Mother in active labor
1. Gestational age of >28 weeks
2. Intact membranes
3. AFI < or equal to 8cms
Performed
History taking
Risk factors assessment
Associated comorbidities
General physical examination
USG for AFI was done
Categorization into mild, moderate and severe oligohydramnios
Need for induction (n-50 patients)
Mode of delivery
Cesarean section n-48
Vaginal delivery n-52

9 . RESULTS

The majority of the subjects were antenatal booked. Where urban populations predominated. Even if there were fewer rural residents recorded, their numbers were nonetheless higher than before. The majority of patients who belonged to the middle class were antenatally booked at AIIMS, Bhopal. The increase in rural residents at a tertiary centre can be attributed to a number of recently implemented incentives, free prescription drug programs, and other programs that provide referral transportation and other health care services at no cost to patients and their families. Most of the patients were from the Hindu community. This is primarily attributed to geographic distribution.

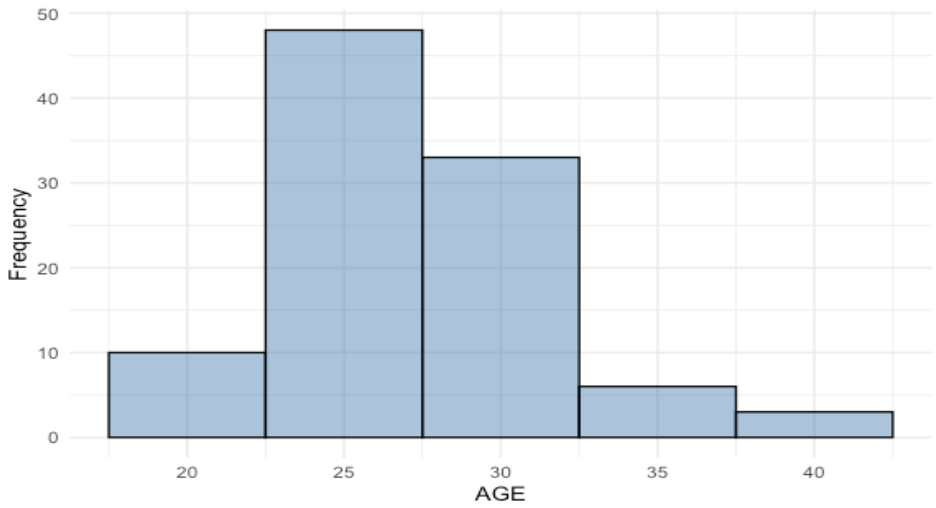
At admission, 16% of the patients reported having abdominal discomfort. 13% of patients sought treatment as a result of declining or losing fetal movements. None of the other patients complained.

TABLE 2: DISTRIBUTION OF BASELINE CHARACTERISTICS

Characteristic	**N = 100**[1]
AGE	27.4 (4.2)
BMI	23.9 (2.2)
GA	37.2 (2.8)
PARITY 1	56 (57%)
PARITY 2	36 (36%)
PARITY 3	5 (5.1%)
PARITY 4	3 (3.0%)
[1] Mean (SD); n (%)	

The above table shows age wise distribution and patient characteristics. The total number of patients recruited in the study was 100 and mean age among the recruited patients was 27.4, mean BMI among the study group was 23.9, mean gestational age among the patients was 37.2 . 57% patients were primigravida, 36% were 2nd gravida , 5% patients were 3rd gravida and 2% patients belonged to 4th gravida.

Figure 5: Age distribution



The above bar diagram shows age wise distribution of the patients where maximum number of patients belonged to 27± 4years.

TABLE 3: DISTRIBUTION OF COMORBIDITIES AND RISK FACTORS

CHARACTERISTIC	**N = 100**[1]
COMORBIDITY ANY	
NO COMORBIDITY	75 (75%)
ANY COMORBIDITY	25 (25%)
CO-MORBIDITIES	
ANEMIA	2 (8.0%)
ASTHMA	2 (8.0%)
BICORNUATE UTERUS	1 (4.0%)
CONGENITAL BLINDNESS	1 (4.0%)
EPILEPSY	1 (4.0%)
HIV +	1 (4.0%)
HYPOTHYROIDISM	12 (48%)
INTRAMURAL FIBROID	1 (4.0%)
MYOMECTOMY	1 (4.0%)
PCOD	1 (4.0%)

PREVIOUS ECTOPIC	1 (4.0%)
HYPOXIC ENCEPHALOPATHY	1 (4.0%)
ASSOCIATED RISK FACTOR	
No Risk	42 (42%)
Any Risk Factor	58 (58%)
RISK FACTORS	
ANHYDRAMNIOS	1 (1.7%)
APH	1 (1.7%)
BREECH	2 (3.4%)
CDH	1 (1.7%)
CPD	1 (1.7%)
DUODENAL ATRESIA	1 (1.7%)
FGR	22 (37.7%)
FGR, CDH	1 (1.7%)
FGR, CPR<1	1 (1.7%)
IHCP	3 (5.2%)
INCREASED RISK OF DOWN SYNDROME	1 (1.7%)
LOW LYING PLACENTA	1 (1.7%)
MSL	2 (3.4%)
PRETERM	13 (22%)
RH NEGATIVE	2 (3.4%)
RH-, ICT+	1 (1.7%)
THROMBOCYTOPENIA	2 (3.4%)
[1] n (%)	

Among the comorbidities and risk factors 75% patient had no comorbidities and 42% had no risk factor.48% of the patient had hypothyroidism in antenatal period.8% of the patient had anemia and asthma.

Among 58 having the risk factors, 37.7%patient had ultrasonography finding of fetal growth restriction,22% patient had preterm delivery.

TABLE 4: DISTRIBUTION OF AFI AND SEVERITY OF OLIGOHYDRAMNIOS

Characteristic	**N = 100**[1]
AFI	5.1 (1.7)
SEVERITY OF OLIGOHYDRAMNIOS	
Mild (5.1 - 7.9)	68 (68%)
Moderate (3.1 - 5)	12 (12%)
Severe (<=3)	20 (20%)
[1]Mean (SD); n (%)	

Total number of patients recruited were 100 with oligohydramnios, among them 68% patient had ultrasonographic finding of mild oligohyramnios(5.1-7.9),12%(3.1-5) of the patient had moderate oligohydramnios and 20%(<=3) had severe oligohydramnios.

Figure 6 Distribution of AFI

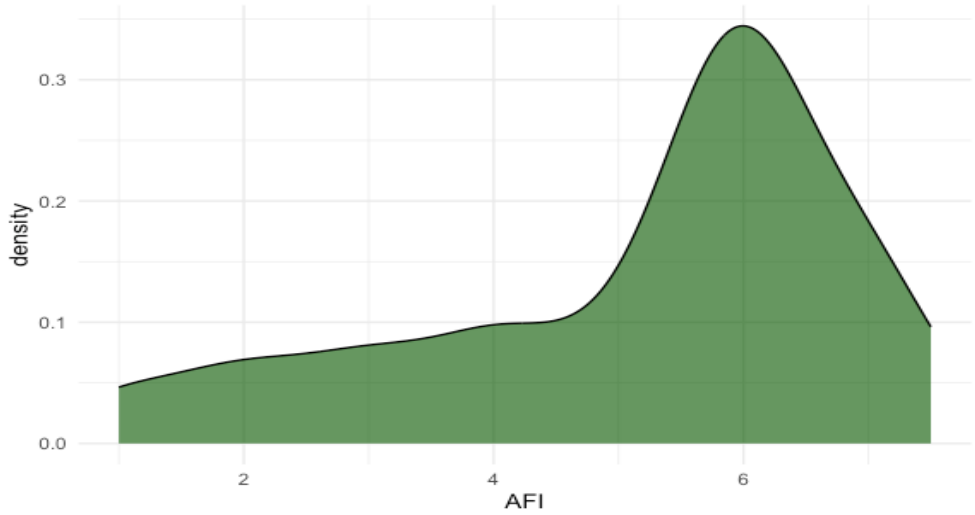


Figure: The graphical representation shows the maximum patient belonged to mild oligohydramnios average of 6 cm.

Figure 7 Distribution of Severity of Oligohydramnios

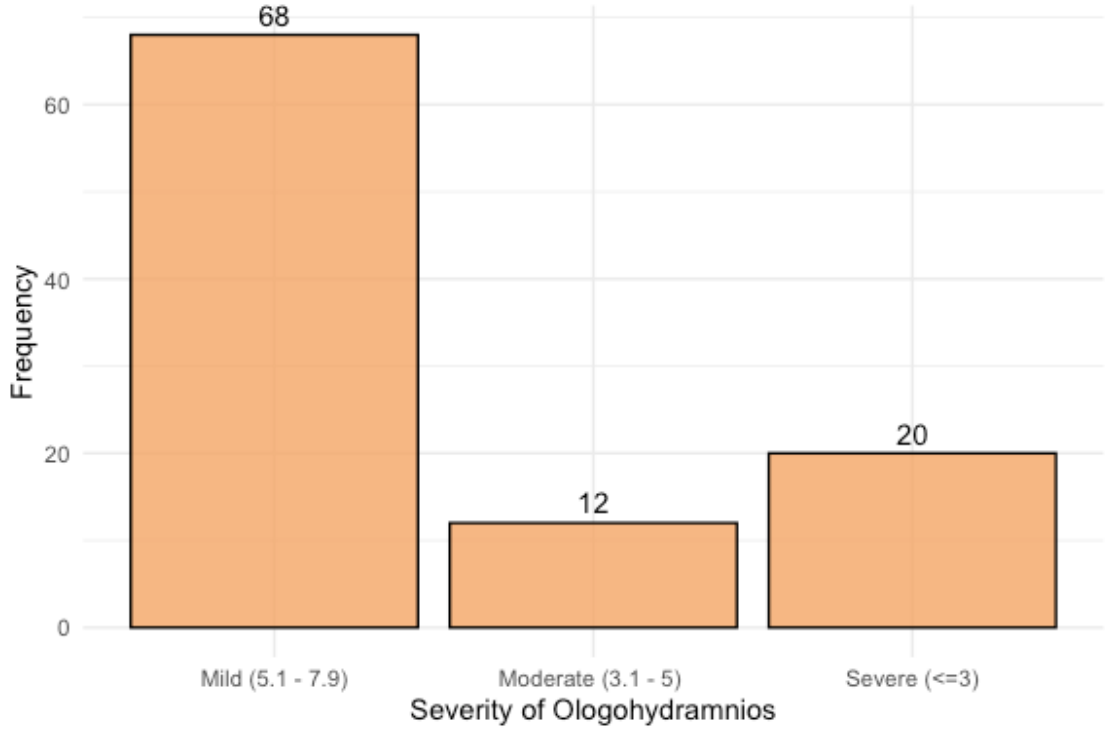


Figure: Above figure depict the distribution of oligohydramnios among the recruited patients .68, 12 and 20 had mild, moderate and severe oligohydramnios.

TABLE 5 DISTRIBUTION OF INTRAPARTUM VARIABLES

Characteristic	Overall, N = 100[1]	Mild (5.1 - 7.9), N = 68[1]	**Moderate (3.1 - 5) **, N = 12[1]	Severe (<=3), N = 20[1]	p-value[2]
LIQUOR					0.725
Clear	87 (87%)	60 (88%)	10 (83%)	17 (85%)	
MSL	13 (13%)	8 (12%)	2 (17%)	3 (15%)	
NEED FOR INDUCTION	50 (50%)	35 (51%)	4 (33%)	11 (55%)	0.451
CTG					0.840
Reassuring	84 (84%)	58 (85%)	10 (83%)	16 (80%)	
Non-Reassuring	16 (16%)	10 (15%)	2 (17%)	4 (20%)	
CESAREAN DELIVERY	48 (48%)	28 (41%)	8 (67%)	12 (60%)	0.129
VAGINAL DELIVERY	52 (52%)	40 (59%)	4 (33%)	8 (40%)	0.129

[1] n (%)

[2] Fisher's exact test; Pearson's Chi-squared test

Among 100 patients recruited 50% patient required induction of labour among which 11/20 patient belonged to category of severe oligohydramnios.

16/20 from severe oligohyramnios had reassuring CTG,4/20 had non-reassuring CTG during labour.

48 patients underwent caesarean delivery, 12/20 were from the category of severe oligohydramnios.

52 patients underwent vaginal delivery,8/20 were from the category of severe oligohydramnios.

In all the categories of oligohyramnios, maximum patient had clear amniotic fluid following delivery.

Hence no statistical significance noted in the above variables.

TABLE 6 DISTRIBUTION OF FETAL OUTCOME VARIABLES

Characteristic	Overall, N = 100[1]	Mild (5.1 - 7.9), N = 68[1]	**Moderate (3.1 - 5) **, N = 12[1]	Severe (<=3), N = 20[1]	p-value[2]
NICU ADMISSION	40 (40%)	27 (40%)	4 (33%)	9 (45%)	0.818
APGAR AT 1	7.5 (1.3)	7.5 (1.5)	7.9 (0.5)	7.6 (0.7)	0.581
APAGR at 5	8.1 (1.3)	8.1 (1.4)	8.5 (0.7)	8.0 (1.1)	0.400
BIRTH WEIGHT					0.744
<1000 gm	4 (4.0%)	2 (2.9%)	1 (8.3%)	1 (5.0%)	
1001 to 2000 gm	19 (19%)	12 (18%)	3 (25%)	4 (20%)	
2001 to 2500 gm	40 (40%)	30 (44%)	3 (25%)	7 (35%)	
>2500 gm	37 (37%)	24 (35%)	5 (42%)	8 (40%)	

[1] n (%); Mean (SD)

[2] Fisher's exact test; Kruskal-Wallis rank sum test

In the recruited patients, babies of 40 patient required NICU admission in view of low apgar score at birth.

Most of the babies born had birth weight ranging from 2001 to 2500grams.Among severe oligohydramnios only 8/20 had birth weight more than 2500grams.Out of 100 babies born, 4 babies were less than 1000grams.

TABLE 7 DISTRIBUTION OF VARIABLE (SEVERITY OF OLIGOHYDRAMNIOS) ACROSS CTG

Characteristic	**Overall**, N = 100[1]	**Reassuring**, N = 84[1]	**Non-Reassuring**, N = 16[1]	**p-value**[2]
SEVERITY OF OLIGOHYDRAMNIOS				0.840
Mild (5.1 - 7.9)	68 (68%)	58 (69%)	10 (62%)	
Moderate (3.1 - 5)	12 (12%)	10 (12%)	2 (12%)	
Severe (<=3)	20 (20%)	16 (19%)	4 (25%)	

[1] Mean (SD); n (%)

[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test

Among the patient taken as sample ,20 patients among the category of severe oligohydramnios 16 patients had reassuring CTG and 4 patients had non reassuring CTG.

TABLE 8 DISTRIBUTION OF NEED FOR INDUCTION AND MODE OF DELIVERY ACROSS CTG

Characteristic	Overall, N = 1001	Reassuring, N = 841	Non-Reassuring, N = 161	p-value2
NEED FOR INDUCTION	50 (50%)	45 (54%)	5 (31%)	0.102
CESAREAN DELIVERY	48 (48%)	34 (40%)	14 (88%)	<0.001
VAGINAL DELIVERY	52 (52%)	50 (60%)	2 (12%)	0.101
[1] Mean (SD); n (%)				
[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test				

Among the patients recruited 50 patients needed induction of labour and during intra partum time 45 patient had reassuring CTG whereas 5 patient had non reassuring.

Among the patient who underwent caesarean section,88% of them had NON Reassuring CTG which showed a significant p value of <0.001. This explain that there was significant association between non reassuring CTG and caesarean deliveries.

TABLE 9 DISTRIBUTION OF VARIABLE LIKE NICU ADMISSION, APGAR AND BIRTH WEIGHT ACROSS CTG GROUP

Characteristic	**Overall**, N = 100[1]	**Reassuring**, N = 84[1]	**Non-Reassuring**, N = 16[1]	**p-value**[2]
NICU ADMISSION	40 (40%)	27 (32%)	13 (81%)	<0.001
APGAR AT 1	7.5 (1.3)	7.6 (1.2)	7.2 (1.3)	0.101
APAGR at 5	8.1 (1.3)	8.2 (1.3)	7.8 (0.9)	0.012
BIRTH WEIGHT				<0.001
<1000 gm	4 (4.0%)	1 (1.2%)	3 (19%)	
1001 to 2000 gm	19 (19%)	13 (15%)	6 (38%)	
2001 to 2500 gm	40 (40%)	34 (40%)	6 (38%)	
>2500 gm	37 (37%)	36 (43%)	1 (6.2%)	

[1] Mean (SD); n (%)

[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test

Patients those had non reassuring CTG require NICU admission for their babies. Out of 16 patient with non reassuring CTG 13 babies required NICU admission. Among <1000gram 3/4 had non reassuring CTG. 81% of the neonates who had NICU admission had NON Reassuring CTG in the intrapartum period which showed a significant p value of <0.001. This indicates that there was a significant association between non reassuring CTG and NICU admissions.

TABLE 10 DISTRIBUTION OF GESTATIONAL AGE AND AFI ACROSS ANY RISK FACTORS

Characteristic	Overall, N = 100[1]	No Risk Factor, N = 42[1]	Any Risk Factor, N = 58[1]	p-value[2]
GA	37.2 (2.8)	38.4 (1.6)	36.3 (3.1)	<0.001
AFI	5.1 (1.7)	5.3 (1.6)	5.0 (1.8)	0.273
SEVERITY OF OLIGOHYDRAMNIOS				0.021
Mild (5.1 - 7.9)	68 (68%)	28 (67%)	40 (69%)	
Moderate (3.1 - 5)	12 (12%)	9 (21%)	3 (5.2%)	
Severe (<=3)	20 (20%)	5 (12%)	15 (26%)	
[1] Mean (SD); n (%)				
[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test				

It is observed that patients having risk factors underwent preterm deliveries,69% of patient in the category of mild oligohydramnios had risk factors,5.2% in the category of moderate oligohydramnios and 26% in the category of severe oligohydramnios had associated risk factors.

TABLE 11 DISTRIBUTION OF NEED FOR INDUCTION ,MODE OF DELIVERY ,APGAR AND BIRTH WEIGHT ACROSS ANY RISK FACTORS

Characteristic	**Overall, N = 100**[1]	**No Risk Factor, N = 42**[1]	**Any Risk Factor, N = 58**[1]	**p-value**[2]
NEED FOR INDUCTION	50 (50%)	23 (55%)	27 (47%)	0.418
CESAREAN DELIVERY	48 (48%)	16 (38%)	32 (55%)	0.092
VAGINAL DELIVERY	52 (52%)	26 (62%)	26 (45%)	0.092
NICU ADMISSION	40 (40%)	14 (33%)	26 (45%)	0.247
APGAR AT 1	7.5 (1.3)	7.6 (1.2)	7.5 (1.3)	0.298
APAGR at 5	8.1 (1.3)	8.5 (1.2)	7.9 (1.2)	<0.001
CTG				0.040
Reassuring	84 (84%)	39 (93%)	45 (78%)	
Non-Reassuring	16 (16%)	3 (7.1%)	13 (22%)	
BIRTH WEIGHT				0.008
<1000 gm	4 (4.0%)	0 (0%)	4 (6.9%)	
1001 to 2000 gm	19 (19%)	5 (12%)	14 (24%)	
2001 to 2500 gm	40 (40%)	14 (33%)	26 (45%)	
>2500 gm	37 (37%)	23 (55%)	14 (24%)	

[1] Mean (SD); n (%)

[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test

On comparing the associated risk factor among the recruited patients 47% had need for induction,55% underwent caesarean delivery ,78% patient had non reassuring CTG. It is concluded that patient having risk factors had delivered preterm babies and had low APGAR score of the babies.

TABLE 12 DISTRIBUTION OF PARITY ACROSS TYPE OF LIQUOR

Characteristic	**Overall**, N = 100[1]	**Clear**, N = 87[1]	**MSL**, N = 13[1]	**p-value**[2]
PARITY				0.491
1	56 (57%)	46 (53%)	10 (77%)	
2	36 (36%)	33 (38%)	3 (23%)	
3	5 (5.1%)	5 (5.8%)	0 (0%)	
4	2 (2.0%)	2 (2.3%)	0 (0%)	

[1]Mean (SD); n (%)

[2]Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-squared test

Patient with meconium stained liquor most of the them were primigravida.

TABLE 13 DISTRIBUTION OF INDUCTION OF LABOUR FOR OLIGOHYDRAMNIOS AND MODE OF DELIVERY ACROSS TYPE OF LIQUOR

Characteristic	**Overall**, N = 100[1]	**Clear**, N = 87[1]	**MSL**, N = 13[1]	**p-value**[2]
NEED FOR INDUCTION	50 (50%)	45 (52%)	5 (38%)	0.372
CESAREAN DELIVERY	48 (48%)	37 (43%)	11 (85%)	0.005
VAGINAL DELIVERY	52 (52%)	50 (57%)	2 (15%)	0.005

[1] Mean (SD); n (%)

[2] Wilcoxon rank sum test; Pearson’s Chi-squared test; Fisher’s exact test

In the recruited patients ,5 patient those were induced had meconium stained liquor. Patient with meconium stained liquor 11 patient underwent caesarean delivery**.**

TABLE 14 DISTRIBUTION OF SEVERITY OF OLIGOHYDRAMNIOS, NICU ADMISSION, APGAR, CTG AND BIRTH WEIGHT ACROSS TYPE OF LIQUOR

Characteristic	**Overall**, N = 100[1]	**Clear**, N = 87[1]	**MSL**, N = 13[1]	**p-value**[2]
SEVERITY OF OLIGOHYDRAMNIOS				0.725
Mild (5.1 - 7.9)	68 (68%)	60 (69%)	8 (62%)	
Moderate (3.1 - 5)	12 (12%)	10 (11%)	2 (15%)	
Severe (<=3)	20 (20%)	17 (20%)	3 (23%)	
NICU ADMISSION	40 (40%)	37 (43%)	3 (23%)	0.182
APGAR AT 1	7.5 (1.3)	7.5 (1.3)	7.8 (0.4)	0.604
APAGR at 5	8.1 (1.3)	8.1 (1.3)	8.5 (0.7)	0.246
CTG				0.432
Reassuring	84 (84%)	74 (85%)	10 (77%)	
Non-Reassuring	16 (16%)	13 (15%)	3 (23%)	
BIRTH WEIGHT				0.645
<1000 gm	4 (4.0%)	4 (4.6%)	0 (0%)	
1001 to 2000 gm	19 (19%)	18 (21%)	1 (7.7%)	
2001 to 2500 gm	40 (40%)	33 (38%)	7 (54%)	
>2500 gm	37 (37%)	32 (37%)	5 (38%)	

[1] Mean (SD); n (%)

[2] Wilcoxon rank sum test; Pearson's Chi-squared test; Fisher's exact test

Patients with severe oligohydramnios 23% of them had meconium stained liquor ,23% patient had non reassuring CTG ,23% required NICU admission, APGAR score was >7 at 5 min. Most of the babies had weight in the category of 2001-2500grams.

TABLE 15 DISTRIBUTION OF VARIABLES (NEED FOR INDUCTION AND MODE OF DELIVERY) ACROSS SEVERITY OF OLIGOHYDRAMNIOS

Characteristic	Overall, N = 100[1]	Mild (5.1 - 7.9), N = 68[1]	**Moderate (3.1 - 5) **, N = 12[1]	Severe (<=3), N = 20[1]	p-value[2]
NEED FOR INDUCTION	50 (50%)	35 (51%)	4 (33%)	11 (55%)	0.451
CESAREAN DELIVERY	48 (48%)	28 (41%)	8 (67%)	12 (60%)	0.129
VAGINAL DELIVERY	52 (52%)	40 (59%)	4 (33%)	8 (40%)	0.129
[1] Mean (SD); n (%)					
[2] Kruskal-Wallis rank sum test; Pearson's Chi-squared test; Fisher's exact test					

Among the patient recruited 50 required induction of labour and among which 11 patients those were induced belonged to the category of severe oligohydramnios.12/20 patient underwent caesarean section in the category of severe oligohydramnios.

TABLE 16 DISTRIBUTION OF VARIABLES (NICU ADMISSION, APGAR, CTG AND BIRTH WEIGHT) ACROSS SEVERITY OF OLIGOHYDRAMNIOS

Characteristic	**Overall, N = 100**[1]	**Mild (5.1 - 7.9), N = 68**[1]	****Moderate (3.1 - 5) **, N = 12**[1]	**Severe (<=3), N = 20**[1]	**p-value**[2]
NICU ADMISSION	40 (40%)	27 (40%)	4 (33%)	9 (45%)	0.818
APGAR AT 1	7.5 (1.3)	7.5 (1.5)	7.9 (0.5)	7.6 (0.7)	0.581
APAGR at 5	8.1 (1.3)	8.1 (1.4)	8.5 (0.7)	8.0 (1.1)	0.400
CTG					0.840
Reassuring	84 (84%)	58 (85%)	10 (83%)	16 (80%)	
Non-Reassuring	16 (16%)	10 (15%)	2 (17%)	4 (20%)	
BIRTH WEIGHT					0.744
<1000 gm	4 (4.0%)	2 (2.9%)	1 (8.3%)	1 (5.0%)	
1001 to 2000 gm	19 (19%)	12 (18%)	3 (25%)	4 (20%)	
2001 to 2500 gm	40 (40%)	30 (44%)	3 (25%)	7 (35%)	
>2500 gm	37 (37%)	24 (35%)	5 (42%)	8 (40%)	

[1] Mean (SD); n (%)

[2] Kruskal-Wallis rank sum test; Pearson's Chi-squared test; Fisher's exact test

Patient recruited in our study, total 40 babies required NICU care among them 9 patient belonged to the category of severe oligohydramnios. There was no effect noted on the APGAR status in all categories.

In our study 4 patient had non reassuring CTG among the category of severe oligohydramnios. No significant association noted among severity of liquor and birth weight.

TABLE 17 PERINATAL OUTCOMES

SEVERITY OF OLIGOHYDRAMNIOS	**DISCHARGED ALIVE**	**EXPIRED**
Mild (5.1 - 7.9)	68	**0**
Moderate (3.1 - 5)	**11**	**1**
Severe (<=3)	**20**	**0**

99% of the babies were discharged healthy.1 of the baby died on post cesarean day 3 in view of meconium aspiration syndrome.

TABLE 18 MATERNAL OUTCOMES

ATONIC PPH	TRAUMATIC PPH
2	1

2 of the patients had atonic PPH which managed with uterotonic drugs and transfusing blood products. No intrauterine packing was required for them. Both of them delivered vaginally.

1 of the patient had cervical tear which was repaired under anaesthesia.

10. DISCUSSION

As concluded in various studies, Primigravida contributed to 56% of cases recruited in our study belonged to oligohydramnios. The bulk of multigravida women are likely managed at the district hospitals, PHCs, and CHCs. Due to greater understanding, most urban families choose tertiary care facilities for first pregnancies. Finally, when notified of oligohydramnios, rural individuals who are knowledgeable enough to undergo an ultrasonography choose tertiary center care.

Mean age of patients were 27±4years.Mean gestational age of the patients were 37weeks +/- 4 days.

The findings of this study are consistent with those of investigations by Guin G et al, which contained 49.9% primigravida(5).

According to Zhang J et al., the study included 45/86 or 53% primigravida(50).

In our study 68% patients belonged to the category of 5.1-7.9 AFI.12% of the patient had AFI of 3.1-5cm and 20%of the patient had AFI of <=3cm on comparing our study to Shrestha D, study showed 55% cases belonged to AFI<5cm and 45% cases had AFI 5-10cm(51).

In different studies done cut off for AFI to declare oligohydramnios is not constant as study done by Rossi AC et al, observed AFI<5cm as cut off(32).Achalabi et al had taken AFI <5cm and AFI >5cm in their study to compare outcomes(52).Locatelli et al has compared perinatal outcome between case which had AFI ≤5cm and those with AFI >5cm(53).

Danon D et al had studied 67 pregnancies with AFI ≤ 5cm while other group of pregnant female constituting 276 with AFI >5cm(54).

In our study mean gestational age in different group of oligohydramnios is 37±2 weeks in comparison to Jun Z et al reported mean gestational age to be 38.1±3.3weeks(50).

Mode of induction used is prostaglandin E2 gel in all 50% of the patient who required induction in our study, similarly Alchalabi HA et al studied like us labour induction in all subjects and perinatal outcome(52).While only 9.6% of the class had normal amniotic fluid, Melamed N. et al. discovered 50% induction in the isolated oligohydramnios group(55). Induced labor was

reported in 30% of women by Rossi AC et al(32). According to Ahmad H. et al., the rate of induction was 63% in the exposed group and 14% in the unexposed group(56).

Our study concluded 48% patient who required cesarean section and 52% of the patient delivered by vaginal delivery. Among which 85% patient belonged to the group of severe oligohydramnios who underwent cesarean section. Our study is close to Bangal VB et al who observed 56% patient had vaginal delivery and 44% had cesarean delivery. Similarly study is also close to Sharma and Gehlot in which 40% required cesarean delivery.

The results of our study is also similar to Ahmad H et al reported 57.7% vaginal delivery and 42.3% cesarean deliveries in exposed group(56).

15.2% of 341 patients had cesarean births, according to Locatelli et al(53).

Overall cesarean delivery rates were reported to be 14% (920/6571) and 19% (16/86) in women with normal AFI and oligohydramnios, respectively, according to Zhang J et al(50).

According to Melamed N. et al., women with isolated oligohydramnios were approximately 47.2% more likely to give birth by cesarean section(55).

Obstetric intervention was needed in 254/657 women, or 38.66%, according to Rossi C et al. These births were all vaginal in 76/254 instances, or 29.8%, and caesarean in 178/254 cases, or 70.2%(32).

LSCS was estimated by Chate P et al. in 64% patients(51).39.4% of women underwent cesarean delivery in the group with AFI < 5 cm, and 14% in the group with AFI >5 cm, according to Alchalabi HA et al(52).

Fetal distress was the indication of cesarean section in 34 patients out of 48 patients those underwent caesarean section and rest 14 of other were taken for cesarean for non progression of labour in our study. In comparison to the study Sharma and Gehlot, Fetal distress was the indication to the cesarean section in 8/40=20% of patients who underwent LSCS. 24/40=60% cases having failure of induction as indication of LSCS as decided by poor Bishop's score at the time of assessment(3).

In 8.2% of instances with an AFI less than 5 cm, Locatelli et al. documented LSCS as a result of fetal distress.

According to Alchalabai HA et al., fetal distress was a factor in 18 out of 26 cesarean deliveries (69.23% of cesareans) which is similar to our study(52).

Our study concluded that there were 40% of babies which required NICU admission among which, 45% belonged to the category of severe oligohydramnios. Our study concluded that severe oligohydramnios babies are more prone for NICU admission. In our study 3% babies had APGAR of <7 at5 min which is similar to the study of Zhang J et al. were 1.2% of both groups (those with and without oligohydramnios) had an APGAR score of less than 7 at 5 minutes(50).

In a related study, Locatelli et al., who included 341 individuals with oligohydramnios, reported no difference in the APGAR score at 5 minutes for a seven or above(53).

In our study majority(40%) of the babies belonged to the birth weight between 2001-2500grams.4% of the babies birth weight was <1000grams among which 1baby belonged to the categories of severe oligohydramnios. There were 37% of babies those weighted >2500grams.The mean gestational age is 37±2 weeks. Our study result in this case is similar to Sharma and Gehlot the average newborn weighs 2610 grams,44% of newborns weighed under 2500 grams(3).

22% babies were born preterm in our study as compared to Sharma and et al.,17% of the babies were preterm.

According to research by Bangal VB et al., there were two babies with birth weights under 1000 g, 38 with birth weights between 1000 and 2000 g, 58 with birth weights between 2000 and 3, and two with birth weights over 3000 g which is also comparable to our study.

Birth weight estimations were 3330 g in the AFI< 5 cm group and 3488 g in the AFI >5 cm group, according to Locatelli et al.

In the AFI< 5 cm group, Alchalabi et al. found that 10.6% of babies had birth weights under 2500 and 89.5% had birth weights over 2500.

Geographical variations may be the cause of the disparity in newborn weights between the western countries and our research area. It is certain since no discernible difference in perinatal outcomes was seen.

The current study is more comparable to Locatelli et al.'s, who identified a 23% incidence of SGA among 341 newborns in their study as in our study 37% babies had fetal growth restriction(53).

In our study total of 16% patient had non reassuring CTG during intrapartum period among which 88% underwent cesarean section which is statically significant. This explain that there was significant association between non reassuring CTG and caesarean deliveries.

Patients those had non reassuring CTG during intrapartum period 81% of the babies required NICU admission.

Among non reassuring CTG during intrapartum period 19%babies had meconium stained liquor. Meconium stained liquor was found in total of 7% of babies studies by Sharma and Gehlot.

Among patient with meconium stained liquor 85% of patient underwent cesarean delivery.

Meconium incidence was observed to be 1.9% in isolated oligohydramnios and 4.3% in the group with normal amniotic fluid content, according to Melamed N et al.

10.1 PERINATAL OUTCOME

In out study 99% of the babies were discharged healthy.1 of the baby died on post cesarean day 3 in view of meconium aspiration syndrome. Rest 39 babies were shifted towards mother side and was discharged healthy. Increased perinatal morbidity in oligohydramnios neonates due to perinatal hypoxia, premature delivery, IUGR, meconium stained liquor, and meconium aspiration syndrome results in a greater rate of NICU admissions. On comparing to the study done by Sharma and Gehlot there was no still birth or intrauterine fetal death as per their study "97% of newborns were discharged in good health. Perinatal mortality as a whole was 3%. 1% of babies stillborn, 1% of babies who die in utero, and 1% of NICU patients die after 7 days. Chhabra et al, concluded , 7.2% incidence of perinatal mortality(57).

1 of the baby had ascites in antenatal period, postnatally diagnosed with PUJ obstruction.

10.2 MATERNAL OUTCOME

Two of the patients had atonic PPH, which was treated with uterotonic medication and blood transfusions. For them, no intrauterine packing was necessary. They both had vaginal births. One of the patients suffered a cervical tear, which was repaired under anesthesia. No significant correlation noted between PPH and severity of oligohydramnios. Total of 48 patient underwent

LSCS.As with major surgery done, duration of hospital stay was more in patients with LSCS, average of 7 days whereas in vaginal delivery average hospital stay was 5 days. Blood transfusions was equal in both caesarean and vaginal delivery.

11. LIMITATION

A larger sample size is required for future research in this area due to the observational nature and small sample size of the current study.

12.CONCLUSION

From the present study, it may be concluded that when there is oligohydramnios, regular antenatal checkup is a key. furthermore, depending on the severity of oligohydramnios plan for delivery and perinatal morbidity should be taken into consideration. Importance of growth scan and AFI estimation on regular antenatal checkup may be highlighted in recommendation.

In this study patient those had non reassuring CTG in intrapartum period underwent caesarean delivery. Majority of the babies had birth weight less than expected as per period of gestation. This concludes that somehow low birth weight is associated with oligohydramnios. Patients having non reassuring CTG, babies had low APGAR score and required NICU admissions.

13. STRENGTH OF THE STUDY

All the parameters of feto maternal outcomes assessed and analysed.It gives a comprehensive overview of patients with oligohydramnios.

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15. ANNEXURES

ANNEXURES-1

All India Institute of Medical Sciences, Bhopal.

PROFORMA

CASE RECORD FORM

- NAME
- AGE/SEX
- UHID
- ETHNICITY
- EDUCATIONAL STATUS
- OBSTETRICS HISTORY
- CHIEF COMPLAINTS
- ANTENATAL HISTORY INCLUDING 3 TRIMESTERS

- PERSONAL HISTORY
    - SMOKING
    - ADDICTIVE HABIT
    - BOWEL HABITS

- FAMILY HISTORY
- H/O CO MORBIDITIES-
- DIABETES
- HYPERTENSION

- CONNECTIVE TISSUE DISORDERS
- DRUG H/O

GENERAL EXAMINATION

- GAIT
- WEIGHT-
- HEIGHT-
- BMI-
- PALLOR-
- ODEMA-
- LYMPHADENOPATHY
- JAUNDICE
- CYANOSIS
- VITALS

  BP-

  PR-

  TEMPERATURE-

  SPO2-

  RR-

SYSTEMIC EXAMINATION

- CNS: dementia, PD, MS
- CVS:
- RS:

PER ABDOMEN EXAMINATION

- Presentation
- Clinical estimation of liquor

- FHS Monitoring

Routine investigations:

ABO Rh blood grouping

Complete blood count:

S.TSH

HIV/VDRL/HBsAg/ANTI-HCV

OGTT

Urine r/m

USG for AFI

ANNEXURES-2

All India Institute of Medical Sciences, Bhopal.

PATIENT INFORMATION SHEET (STUDY GROUP)

Title of the study: "EVALUATION OF MATERNAL AND FETAL OUTCOMES WITH OLIGOHYDRAMNIOS IN THIRD TRIMESTER AT TERTIARY CARE CENTRE -- A Hospital based Longitudinal study "

Principal Investigator: Dr. Manpreet Kaur , Junior Resident (Academic) at Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, Bhopal, MP.

Dear Participant,

Before you decide whether or not you wish to participate in this study, it is important for you to understand why the study is being conducted and what it will involve. Please read this information sheet carefully. You are free to ask any questions with regard to this study.

What is the purpose of this study?

The information obtained through this study will help us identify the proportion of women with oligohydramnios in third trimester and will help in knowing the fetal and maternal outcomes

Why have I been invited to participate in this study?

You are eligible to participate in this study because the study requires all antenatal females with oligohydramnios.

What does this study involve?

If you consent to participating in this study, you will be asked a few questions about your clinical symptoms, demographical details, past surgical and medical history. Then you will be

subjected to clinical examination and laboratory investigations required as per standard management protocol at All India Institute of Medical Sciences hospital, Bhopal.
You will not be made to undergo any invasive procedure for the purpose of this study.

Are there risks to me in taking part in this study?

Less than minimal risk is involved inparticipating in this study. The results may be of benefit to you, but it will useful for knowing the fetal and maternal outcomes in antenatal females with oligohydramnios

What if I don't want to take part in this study or if I want to withdraw later?

Participation in this study is voluntary. It is completely up to you whether or not you participate. If you decide not to participate, it will not influence the diagnosis and management that you receive now or at later date. If you wish to withdraw from the study once it has started, you can do so at any time and you will not be asked to provide any reason for the same. No information will be collected or used after you have withdrawn from the study.

Will the information I provide as well as my reports be kept confidential?

If you consent to participate in this study, the information collected from you will be coded and kept confidential. Only the research team members will have the right to access this information. During the publication of this study, no personal information will be disclosed. The consent form will not be attached with the case-study form.

Whom do I contact to clarify any doubts with regard to this study?

Any questions with regard to this study should be addressed to the Principal Investigator, Dr. Manpreet Kaur, Junior Resident at Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, Bhopal, MP (6397247556).

ANNEXURES-3

सहभागी के लिए जानकारी(अध्ययन समूह)

अध्ययन का शीर्षक – ''तृतीयक देखभाल केंद्र में तीसरी तिमाही में ओलिगोहाइड्रोमियोस के साथ मातृ और शिशु परिणामों का मूल्यांकन-एक अस्पताल आधारित देशांतर अध्ययन''

प्रधान अन्वेषक: डॉ. मनप्रीत कौर, जूनियर रेजिडेंट, प्रसूति एवं स्त्री रोग विभाग, अखिल भारतीय आयुर्विज्ञान संस्थान, भोपाल, एम.पी ।

परिचय

आपको इस शोध अध्ययन में स्वेच्छा से भाग लेने के लिए आमंत्रित किया गया है। यह अध्ययन प्रसूति विभाग, एम्स, भोपाल के समग्र समन्वय और तकनीकी मार्गदर्शन के तहत लागू किया जाएगा। इस अध्ययन में भाग लेने के लिए सहमत होने से पहले, यह महत्वपूर्ण है कि आप इस फॉर्म को पढ़ें और समझें। यह अध्ययन के उद्देश्य, प्रक्रियाओं, लाभों, असुविधाओं और सावधानियों का वर्णन करता है।

1. **इस अध्ययन का उद्देश्य क्या है ?**

इस अध्ययन के माध्यम से प्राप्त जानकारी हमें तीसरी तिमाही में ओलिगोहाइड्रेमियोस के साथ महिलाओं के अनुपात की पहचान करने में मदद करेगी और शिशु और मातृ परिणामों को जानने में मदद करेगी I

2. **मुझे इस अध्ययन में भाग लेने के लिए क्यों आमंत्रित किया गया है?**

आप इस अध्ययन में भाग लेने के लिए पात्र हैं क्योंकि अध्ययन के लिए ओलिगोहाइड्रोमनमिओस के साथ सभी प्रसवपूर्व महिलाओं की आवश्यकता होती है I

3. **इस अध्ययन में क्या शामिल है?**

यदि आप इस अध्ययन में भाग लेने के लिए सहमति, आप अपने नैदानिक लक्षण, जनसांख्यिकीय विवरण, पिछले शल्य चिकित्सा और चिकित्सा के इतिहास के बारे में कुछ सवाल पूछा जाएगा । इसके बाद भोपाल के एम्स अस्पताल में स्टैंडर्ड मैनेजमेंट प्रोटोकॉल के अनुसार जरूरी क्लीनिकल जांच और प्रयोगशाला जांच के अधीन होंगे। आप इस अध्ययन के उद्देश्य के लिए किसी भी आक्रामक प्रक्रिया से गुजरना करने के लिए नहीं किया जाएगा।

4.क्या इस अध्ययन में भाग लेने में मुझे कोई जोखिम है?

इस अध्ययन में भाग लेने में न्यूनतम जोखिम से कम शामिल है। परिणाम आपके लिए फायदेमंद हो सकते हैं, लेकिन यह ओलिगोहाइड्रेमियोस के साथ प्रसवपूर्व महिलाओं में शिशु और मातृ परिणामों को जानने के लिए उपयोगी होगाI

5.क्या होगा यदि मैं इस अध्ययन में भाग नहीं लेना चाहता या यदि मैं बाद में वापस लेना चाहता हूँ?

इस अध्ययन में भागीदारी स्वैच्छिक है। यह पूरी तरह से आप पर निर्भर है । यदि आप भाग नहीं लेने का निर्णय लेते हैं, तो यह आपके या भविष्य में प्राप्त होने वाले निदान को प्रभावित नहीं करेगा। यदि आप एक बार शुरू होने के बाद अध्ययन से हटना चाहते हैं, तो आप किसी भी समय ऐसा कर सकते हैं और आपको इसके लिए कोई कारण प्रदान करने के लिए नहीं कहा जाएगा। आपके द्वारा अध्ययन से हटने के बाद कोई भी जानकारी एकत्र या उपयोग नहीं की जाएगी।

6.क्या मेरी जानकारी गोपनीय रखी जाएगी?

यदि आप इस अध्ययन में भाग लेने की सहमति देते हैं, तो आपके द्वारा एकत्रित की गई जानकारी को गोपनीय रखा जाएगा और केवल अनुसंधान दल के सदस्यों को ही इस जानकारी तक पहुंचने का अधिकार

होगा। इस अध्ययन के प्रकाशन के दौरान, एकत्र की गई कोई भी व्यक्तिगत जानकारी प्रकाशित नहीं की जाएगी। सहमति फॉर्म केस-स्टडी फॉर्म के साथ संलग्न नहीं किया जाएगा
सभी जानकारी गोपनीय रखी जाएगी और इसका उपयोग केवल अनुसंधान के कार्यों के लिए किया जाएगा।

7.अध्ययन के संबंध में किसी भी संदेह को स्पष्ट करने के लिए मैं किससे संपर्क करूं?

इस अध्ययन के संबंध में कोई भी प्रश्न प्रधान अन्वेषक को संबोधित किया जाना चाहिए,
डॉ मनप्रीत कौर ,ऑल इंडिया इंस्टीट्यूट ऑफ मेडिकल साइंसेज, भोपाल, एमपी (6397247556) के प्रसूति एवं स्त्री रोग विभाग में जूनियर रेजिडेंट हैं।

ANNEXURES-4

INFORMED CONSENT TO PARTCIPATE (STUDY GROUP)

Participant identification number for this study:_____

Title of project: **"EVALUATION OF MATERNAL AND FETAL OUTCOMES WITH OLIGOHYDRAMNIOS IN THIRD TRIMESTER AT TERTIARY CARE CENTRE -- A Hospital based Longitudinal study"**

Name of Investigator: Dr Manpreet Kaur
Tel.No(s).6397247556

The contents of the information sheet dated that was provided to me have been read carefully by me / explained in detail to me, in a language that I comprehend, and I have fully understood the contents. I confirm that I have had the opportunity to ask questions and my questions have been satisfactorily answered.

The nature and purpose of the study and its potential risks / benefits and expected duration of the study, and other relevant details of the study have been explained to me in detail. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.

I understand that the information collected about me from my participation in this research and sections of any of my medical notes may be looked at by responsible individuals from AIIMS Bhopal. I give permission for these individuals to have access to my records.

I agree to take part in the above study.

---------- Date:

(Signatures / Left Thumb Impression) Place:

Name of the Participant: Son / Daughter /Spouse of:

Address:

This is to certify that the above consent has been obtained in my presence.

Signatures of the Principal Investigator
Date:
Place:

1) Witness–1

Signature & Name:

2) Witness –2

Signatures & Name

ANNEXURES-5

सहभागी सूचित सहमति प्रपत्र (अध्ययन समूह)

इस जांच के लिए सहभागी पहचान नमबर_____

अनुसन्धान शीर्षक- "तृतीयक देखभाल केंद्र में तीसरी तिमाही में ओलिगोहाइड्रोमियोस के साथ मातृ और शिशु परिणामों का मूल्यांकन-एक अस्पताल आधारित देशांतर अध्ययन "

"

अन्वेषक का नाम- डॉक्टर **मनप्रीत कौर**

फोन नंबर-6397247556

मैंने सूचना पत्र में दिये गए सभी तथ्यों को पढ़ लिया है। मुझे समझ आने वाली भाषा में विस्तारपूर्वक बता दिया है और मैने तथ्यों को भली भांति समझ लिया है। मैं पुष्टि कहता हूँ कि मुझे प्रश्न पूछने का अवसर दिया गया है।

मुझे अध्ययन की प्रकृति, उद्देश्य और इसके संबंधित लाभ जोखिम और अध्ययन की सम्भावित अवधि अन्य प्रासंगिक जानकारी के बारे में विस्तार पूर्वक समझा दिया गया है । मैं समझाता हूँ कि इस अध्ययन में मेरी भागीदारी है और इस अध्ययन से किसी भी समय बिना कोई कारण बताए, बिना मेरी चिकित्सा देखभाल या कानूनी अधिकारों के प्रभावित है अपना नाम बापिस ले सकता(सकती हूं । मैं समझता हूँ कि इस अनुसन्धान में मेरी सहभागिता से मेरे बारे में एकत्र जानकारी और चिकित्सीय नोट के एम्स अस्पताल के जिम्मेदार लोगो द्वारा देखा जाएगा। मैं इन व्यक्तियों को अपने रिकोर्ड देखने कि अनुमति प्रदान करता करती हूँ ।

में उपयुक्त अध्यन में भाग लेने के लिए अपनी सहमति प्रदान करता करती हैं।

सहभागी के हस्ताक्षर / बाए अंगूठे का निशान

दिनांक स्थान-

सहभागी का नाम_____पिता /पति का नाम_____पूरा पता_____

यह प्रमाणित किया जाता है कि उपयुक्त सहमति मेरी उपस्थिति में ली गई है।

मुख्य अन्वेषक के हस्ताक्षर

दिनांक

१) गवाह के हस्ताक्षर
नाम

२) गवाह के हस्ताक्षर
नाम

ANNEXURES-6

MASTERCHART

UHID	AGE	BMI	GA	CO-MORBIDITIES	RISK FACTORS	AFI	SEVERITY OF OLIGOH-YDRAMNIOS	NEED FOR INDUCTION	CESAREAN DELIVERY
361608	24	25	36+5		FGR	2	3	2	1
976599	30	22	32+5	NIL	PRETERM	1	3	2	1
	29	25	38+4	ANEMIA		6	1	2	1
95731	27	22	39+3	HYPOTHYROIDISM		4	2	1	1
317552	22	20	37+6	NIL	FGR	5.2	1	2	2
864207	24	23	40+1	NIL	FGR	2	3	1	2
171965	32	22	34+2		IHCP	2	3	1	2
104021	26	24	38+4	NIL		1	3	1	2
472451	22	22	39+4	NIL		4	2	1	2
146149	23	25	39+5		THROMBOCYTOPENIA	6	1	1	2
858561	31	25	38+0			3	3	2	1
406687	29	25	37+6	NIL		6.1	1	2	1
710137	26	22	35+0		PRETERM	6	1	1	2
25661	23	21	38+0	NIL		7	1	1	2
423981	30	24	37+0		MSL	6	1	2	1
102020	30	22	40+4	HYPOTHYROIDISM		6	1	1	2
283241	27	24	34+5	HYPOTHYROIDISM		7	1	1	2
550745	24	22	36+0	HYPOTHYROIDISM	RH-, ICT+	3	3	1	2
76303	27	21	38+5	HYPOTHYROIDISM		4	2	1	2
360997	35	24	37+4			6	1	2	1
452450	28	23	39+3	HYPOTHYROIDISM		7	1	2	1
594940	24	22	40+2		RH- PREG	7.5	1	2	1

784606	30	22	40+0		MSL	5.1	1	2	1
571521	25	24	40+0			1	3	2	1
697762	30	22	38+0		FGR	7	1	2	1
438186	26	30	38+5		FGR	6	1	2	2
482596	27	22	38+3	ASTHMA	ANEMIA	6	1	1	2
472996	26	30	39+0		ANEMIA	6	1	1	2
225051	31	24	39+2			7	1	2	2
585561	27	24	40+2	HYPOTHYROIDISM		6	1	1	2
644646	27	32	40+0	HYPOTHYROIDISM		7	1	1	2
789109	29	24	39+6		FGR	6	1	1	2
524728	20	25	39+3		CDH	7	1	1	2
402568	28	30	37+1			6	1	1	2
420566	25	29	38+1			7	1	2	2
361104	29	25	38+0		ANHYDRAMNIOS	1	3	2	1
594940	24	22	40+2		RH- PREG	7.5	1	2	1
784606	30	22	40+0		MSL	5.1	1	2	1
571521	25	24	40+0			1	3	2	1
697762	30	22	38+0		FGR	7	1	2	1
292045	22	23	35+5		PRETERM	4	2	2	1
660041	30	24	38+6		IHCP	6	1	2	1
614816	23	25	36+2		PRETERM	4.3	2	2	1
765132	23	24	37+6			4	2	2	1
189724	30	23	38+1			4.5	2	1	2
587401	29	21	39+6			4	2	2	1
620778	32	25	40+2			4	2	2	1
473500	23	24	42+3			5.2	1	1	2
272478	24	23	37+2			5.1	1	2	1
267872	30	22	36+6		PRETERM	5.5	1	2	1
275139	28	24	38+6			4.7	2	2	1
435431	22	25	29+0		FGR	4	2	2	1
520587	24	25	37+0			5.2	1	1	2
154713	24	23	39+6		FGR	7	1	1	2
520927	26	22	39+4		FGR	6.5	1	1	2
617412	27	26	36+4		PRETERM	6	1	1	2
525201	25	24	40+6	HYPOTHYROIDISM		6.5	1	1	2
515796	31	25	37+3			7	1	1	2
710137	26	23	38+6		FGR	6	1	1	2
749274	32	24	28+6	EPILEPSY	PRETERM	3	3	2	2
371000	24	23	37+5		FGR	6	1	1	2
202760	35	22	37+2		IHCP	6	1	1	2
389634	32	25	28+1		PRETERM	2	3	2	1
435431	22	30	29+0		,PRETERM	6	1	2	1
437469	22	26	28+0		LOW LYING PLACENTA	6	1	2	1
475762	22	25	43+3			7	1	2	1
53032	33	27	36+2	PCOD	PRETERM	7	1	2	1
263860	27	24	37+3			7	1	2	1
696146	22	25	35+2		PRETERM	3	3	1	2
652891	32	27	35+4		PRETERM	6	1	1	2
960323	23	24	32+3		PRETERM	3	3	1	2

356612	36	23	39+0			6	1	1	2
54131	21	26	39+2			3	3	2	1
113035	40	27	39+1		INCREASED RISK OF DOWN SYNDROME	6	1	2	1
774732	23	22	37+1		FGR	6	1	1	1
710137	26	23	38+6		FGR	6	1	1	2
331644	27	21	40+0	HYPOTHYOIDISM		6	1	1	2
46583	30	22	38+1	HIV +	FGR	6	1	1	2
996090	30	24	37+5		FGR	5.6	1	1	1
945685	27	26	33+6		APH	5.5	1	2	1
629810	27	22	38+4			5.2	1	1	2
370813	24	23	38+1		FGR	5.1	1	1	2
391365	24	22	39+2		FGR	3	3	1	1
386167	28	23	37+1	ASTHMA	FGR	2	3	1	1
510671	41	23	39+1		RH NEGATIVE	5.8	1	2	1
429851	24	20	37+6	BICORNUATE UTERUS	BREECH	1	3	2	1
435893	26	24	38+0	MYOMECTOMY	THROMBOCYTOPENIA	5.6	1	2	1
636631	32	23	39+6	CONGENITAL BLINDNESS		6	1	2	2
361608	24	22	36+5		FGR,CPR<1	6	1	2	1
455819	31	23	32+3	INTRAMURAL FIBROID	DUODENAL ATRESI	7	1	2	2
480840	35	26	34+6		FGR	5.8	1	2	1
381196	26	22	37+6	previous ectopic		6	1	2	1
487709	26	23	39+6		FGR	5.7	1	2	1
971457	27	23	37+6	HYPOTHYROIDISM	CPD	6	1	2	1
33287	26	22	38+		FGR	2	3	1	1
691245	26	24	37+6		FGR	3	3	1	1
724364	23	25	37+6			2	3	1	2
634599	38	26	38+6		BREECH	7	1	2	2
887243	33	24	37+5		FGR	6	1	2	1
439577	30	23	38+4			6	1	1	2
407329	32	26	40+0	HYPOTHYROIDISM		5.8	1	1	2
578551	29	24	36+5	MODERATE ANEMIA		6.5	1	1	2
604721	28	25	39+3			7.4	1	1	2
861511	23	20	36+0	HYPOXIC ENCEPHALOPATHY		4	2	2	2

VAGINAL DELIVERY	NICU ADMISSION	APGAR AT 1'	APAGR at 5'	CTG	BIRTH WEIGHT	LIQUIOR	PARITY	PERINATAL OUTCOME	MATERNAL OUTCOME
2	1	8	8	1	3	1	2	DISCHARGED	
2	1	8	8	2	2	1	1	ISCHARGED	
2	2	9	9	1	3	1	2	DISCHARGED	
2	1	8	8	1	4	2	1	DISCHARGED	
1	2	9	9	1	3	1	1	DISCHARGED	
1	1	7	7	1	2	2	1	DISCHARGED	
1	2	8	8	1	3	1	2	DISCHARGED	
1	2	8	9	1	4	1	1	DISCHARGED	
1	2	9	8	1	2	1	2	DISCHARGED	
1	2	8	9	1	4	1	2	DISCHARGED	
2	2	8	9	1	4	1	2	DISCHARGED	
2	2	8	9	1	4	1	2	DISCHARGED	
1	1	5	7	2	3	1	1	DISCHARGED	
1	1	8	9	2	2	1	1	DISCHARGED	
2	2	8	9	1	4	2	1	DISCHARGED	
1	2	8	9	1	4	1	1	DISCHARGED	
1	1	8	9	1	3	1	1	DISCHARGED	
1	1	8	9	1	3	1	1	DISCHARGED	
1	2	8	9	1	4	1	2	DISCHARGED	
2	2	8	8	1	4	1	1	DISCHARGED	
2	1	8	9	1	3	1	2	DISCHARGED	
2	2	8	9	1	4	1	1	DISCHARGED	
2	2	8	9	1	4	1	2	DISCHARGED	
2	1	8	9	1	4	1	1	DIISCHARGED	

2	1	8	9	1	3	1	2	DISCHARGED	
1	2	9	9	1	3	1	1	DISCHARGED	
1	2	8	8	1	3	1	2	DISCHARGED	
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2	1	5	6	2	2	1	2	DIISCHARGED	
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